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U. S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
ENVIRONMENTAL DATA SERVICE

KEY TO METEOROLOGICAL RECORDS DOCUMENTATION NO. 5.37

CATALOGUE OF METEOROLOGICAL  
SATELLITE DATA—TIROS VII  
TELEVISION CLOUD  
PHOTOGRAPHY

Part 4





U. S. DEPARTMENT OF COMMERCE  
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## PURPOSE

The Key To Meteorological Records Documentation Series has been established to provide guidance information to research personnel making use of climatological data.

Frequently users of such data have found it necessary to spend a great deal of time establishing whether the criteria for observing or computing various elements have changed over the period of record or in what form the data are available.

It is therefore hoped that the presentation of this series may not only conserve valuable time but may have a direct influence in improving the accuracy of research results.

## PRE FACE

This bulletin is the fourth of a series describing the television cloud photographs obtained by the TIROS VII meteorological satellite. It contains a listing of the cloud photograph sequences taken during the period from January 1, 1965 to August 31, 1965, together with a set of maps showing a schematic nephanalysis for each sequence. It also describes how copies of these photographs may be obtained from the National Weather Records Center. Any future catalog of TIROS VII will contain only the listing of the cloud photograph sequences.

Documentation Section  
National Environmental Satellite Center

## EARLIER TIROS DATA CATALOGUES

Catalogues of earlier TIROS Meteorological Satellite data are available in this series, as follows:

- No. 5.31 "Catalogue of Meteorological Satellite Data - TIROS I Television Cloud Photography", published in 1961, price 70 cents.
- No. 5.32 "Catalogue of Meteorological Satellite Data - TIROS II Television Cloud Photography", published in 1963, price 20 cents.
- No. 5.33 "Catalogue of Meteorological Satellite Data - TIROS III Television Cloud Photography", published in 1962, price 70 cents.
- No. 5.34 "Catalogue of Meteorological Satellite Data - TIROS IV Television Cloud Photography", published in 1963, price \$1.00.
- No. 5.35 "Catalogue of Meteorological Satellite Data - TIROS V Television Cloud Photography", published in 1964, price \$1.75.
- No. 5.36 "Catalogue of Meteorological Satellite Data - TIROS VI Television Cloud Photography", published in 1964, price \$2.00.
- No. 5.37 "Catalogue of Meteorological Satellite Data - TIROS VII Television Cloud Photography Part 1 June 19, 1963 to December 31, 1963", published in 1965, price \$1.25.
- No. 5.37 "Catalogue of Meteorological Satellite Data - TIROS VII Television Cloud Photography Part 2 January 1, 1964 to June 30, 1964", published in 1965, price \$1.00.
- No. 5.37 "Catalogue of Meteorological Satellite Data - TIROS VII Television Cloud Photography Part 3 July 1, 1964 to December 31, 1964", published in 1965, price \$1.00.
- No. 5.38 "Catalogue of Meteorological Satellite Data - TIROS VIII Television Cloud Photography Part 1 December 21, 1963 to June 30, 1964", published in 1965, price \$1.00.
- No. 5.38 "Catalogue of Meteorological Satellite Data - TIROS VIII Television Cloud Photography Part 2 July 1, 1964 to December 31, 1964", published in 1965, in press.

CATALOGUE OF METEOROLOGICAL SATELLITE DATA --  
TIROS VII TELEVISION CLOUD PHOTOGRAPHY  
PART 4 - January 1, 1965 to  
December 31, 1965

The TIROS VII meteorological satellite was launched on June 19, 1963 by the National Aeronautics and Space Administration. It performed satisfactorily through 1965 and on December 31, 1965 was still producing meteorologically usable pictures. Beginning early in 1965, however, TIROS VII was programed, in general, to take only those picture sequences required to supplement the photographic coverage being acquired by other satellites in the series. Engineering checks only of this satellite are planned for 1966. However, operationally useful pictures can be programed and taken with TIROS VII if needed.

Traveling in a nearly circular orbit, TIROS VII averaged about 343 nautical miles above the earth's surface, with a difference of 16 nautical miles between apogee and perigee. It had an orbital period of 97.4 minutes which corresponds to fourteen and a fraction passes around the earth each day. The orbit was inclined at an angle of  $58.2^\circ$  to the earth's equatorial plane and thus picture coverage was obtained only in the zone bounded roughly by  $65^\circ\text{N}$ . and S. latitude.

The satellite was spinning at a rate that varied between 8 and 12 rpm. Being spin-stabilized, the spin axis orientation in space changed only gradually during its operational lifetime. Its two cameras were mounted with their optical axes parallel to the spin axis and were able to view the earth during less than half of each orbital pass. Usable picture coverage was thus restricted to the portion of each orbital pass during which the underlying earth was both sunlit and within view of the cameras. Each of the two cameras on TIROS VII had a wide-angle lens which covered an area about 700 miles square when the optical axis was normal to the earth's surface. At other times a larger area was viewed in oblique perspective.

Camera action aboard TIROS VII was controlled for the most part from three Command-and-Data-Acquisition (CDA) stations: one located at Wallops Station near Chincoteague, Va.; one at Gilmore Creek, Fairbanks, Alaska; and the other at Pacific Missile Range, Point Mugu, Calif. The station at Point Mugu, Calif., ceased operation after April 13, 1965. The satellite came within radio range of one or more of these stations for a few minutes each on 8 or sometimes 9 of its 14 daily passes. During these radio contacts the station could:

1. receive a series of television pictures directly as they were taken, if it was daytime and the optical axes were appropriately oriented;
2. command the system to take pictures remote from the CDA station after a specified time delay and store them on tape aboard the satellite;
3. play back one previously commanded tape sequence from each camera.

Pictures received by the direct mode were taken only over the United States and nearby ocean areas, while tape sequences usually show other parts of the world. In the region traversed during the five or six consecutive passes when the satellite could not be contacted, picture coverage was limited to one tape sequence by each camera each day.

Tape pictures were obtained in sequences up to 32 frames each. Direct sequences were usually shorter and more variable in length. Occasionally the direct pictures obtained at one station on one pass may be grouped into two sequences if the series was interrupted to permit playback of a tape sequence. The time interval between frames was either 10 or 30 second in most direct sequences, and was always 30 seconds in tape sequences.

The pictures are virtually square with some small distortion resulting from the particular setting of the electronic readout equipment. "Fiducial marks" etched on the face of the vidicon tube appear in the picture image as a central cross and four L-shaped corners, although they may show poorly or not at all against a dark background.

Since the satellite was spinning, the earth's image rotates from frame to frame by an amount that depends on how much the satellite's spin rate departed from being an integral



number of rotations during the picture-taking interval. The rotation rate may be considered constant during any one sequence. The center of rotation, which is the point where the optical and spin axes intersect the image plane, is not quite at the central fiducial cross mark. Copies of the focus sheets which show its location with respect to the fiducial marks may be obtained from the Documentation Section, National Environmental Satellite Center. Reproductions of the focus sheets are also included on the microfilms of latitude-longitude overlay grids.

Cloud picture transmissions received at CDA stations were displayed on a television screen and simultaneously recorded on magnetic tape. A 35 mm. camera photographed the television screen, including also a lighted panel board mounted underneath. The panel board information provides a legend for each picture including camera number, mode (TAPE or DIRECT), frame number, orbital pass number, and station initial preceded by "7" or "VII" for TIROS VII. Occasionally a clock appears in the legend but the time shown has no relation to picture taking time.

In the example of figure 1, the legend indicates the picture was received and taken on orbital pass number 10,000 and that it is a TAPE picture taken by camera 2. The letter W at right center following the number "VII" indicates the picture was acquired at Wallops Station, Va.

The panel board legend also contains a series of numerals whose sum indicates the frame number. In figure 1, the frame number is 6, representing the sum of 2 and 4. (At the bottom of the panel board is a similar series of numerals intended to give information on sun angle, but the system did not work properly and the values cannot be easily interpreted.) Within each sequence, the indicated frame numbers increase in the order that the pictures were received at the CDA station. For direct mode this is the time order in which the pictures were taken. But tape sequences were played back to the station in reverse time order. Pictures of both modes are arranged on the film in order of increasing frame number; therefore it is important to note that this arrangement is correct time order for direct sequences, but is reverse time order for tapes.

The orderly time sequence of pictures is sometimes interrupted by spurious noise frames or complicated by skipped frames. In such cases the frame numbers are not a dependable indicator of real picture counts. However, the regular rotation of image orientation is often a helpful clue in determining the actual time interval between particular frames.

The following pages of maps and tabulated listings give descriptive information about the pictures obtained by TIROS VII. In the listings each picture sequence is described by one line, and for each station the sequences are listed in the order in which they appear on the film reel. The column headings and entries have the following meanings:

REEL: Number of the film reel which contains the sequence.

FILM LEGEND: This section gives the information actually appearing on the film in the panel board legend accompanying each picture. This information is used to identify the sequence on the film reel.

PASS: Orbital pass number on which the pictures were read out, as indicated in the upper right corner of the legend.

M: Mode of transmission indicated in the legend.

D = Direct

T = Tape

C: Camera number indicated in the legend.

1 = Camera number one

2 = Camera number two

S: CDA station which received the sequence.

W = Wallops Station, Va.

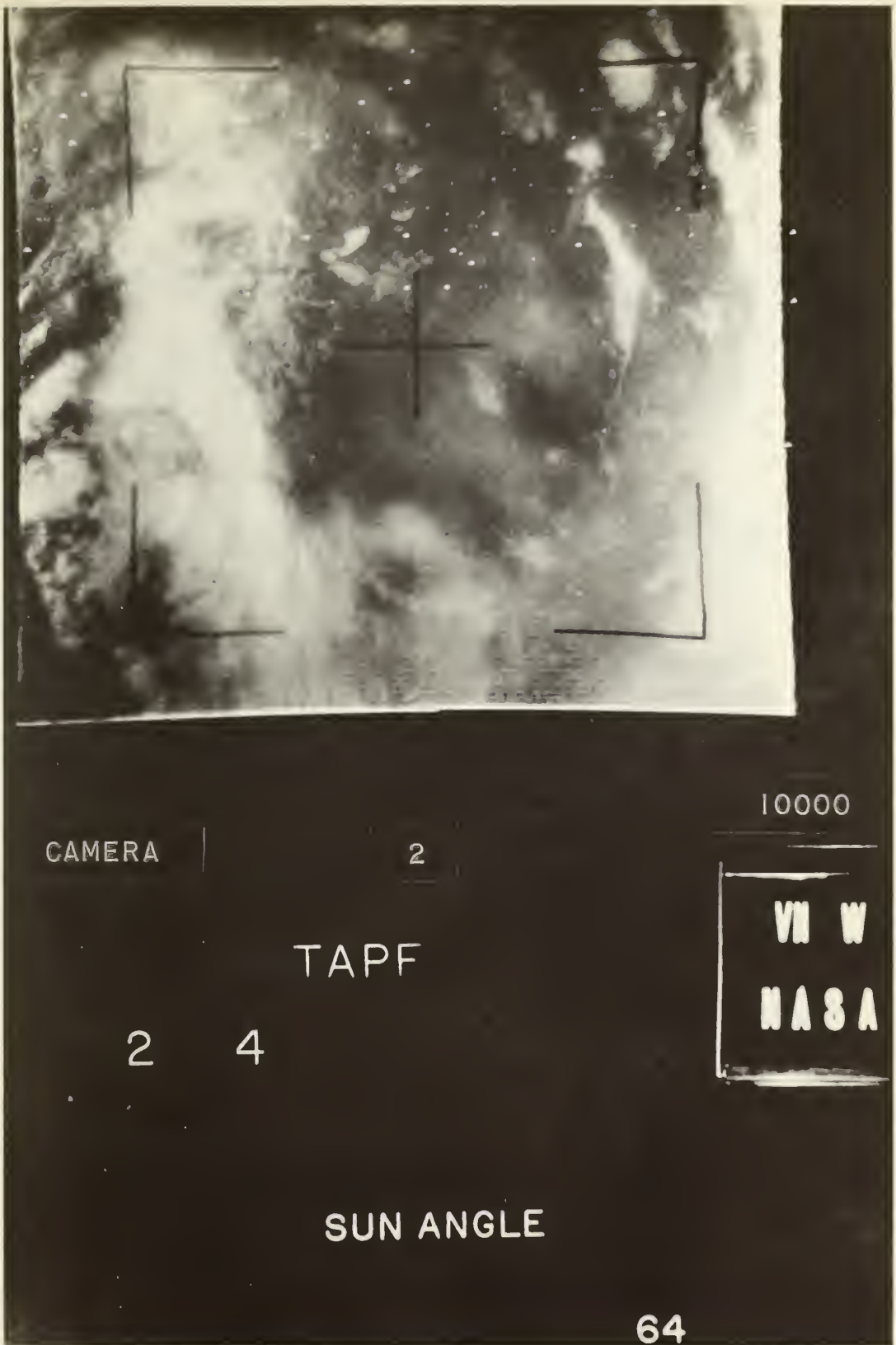


Figure 1 - Example of TIROS VII Cloud Photography

P = Point Mugu, (Pacific Missile Range), Calif.

F = Fairbanks, Alaska (Gilmore Creek)

NOTE: After July 30, 1965 operational use of the satellite data was transferred from the CDA stations to the National Environmental Satellite Center at Suitland, Md. An "N" was used to identify the Satellite Center and appears in the listing after that date. However, the picture transmissions are still received at the CDA stations and the appropriate identifying letter appears on the film.

PICTURE SEQUENCE DATA: This section documents the picture content Sequences having no usable frames or unknown times are on the film reel and are therefore included in the listings, but are not fully documented in this section.

PASS: Orbital pass number on which the first picture of the sequence was taken. For direct sequences this pass number and the readout pass number given under FILM LEGEND are the same. For tape sequence, however, picture taking usually began on an earlier pass.

DATE: Month and day of the middle frame of the sequence.

TIME: Approximate time, in hours and minutes (GMT), of the midpoint in the sequence. This time is also given with the nephanalysis on the coverage map.

FRAME:

TI: Time interval, in seconds, between frames. V indicates time interval varies within the sequence.

US: Number of usable frames in the sequence.

+: Number of frames in which the central fiducial cross mark appears on the earth, indicating that the earth's image occupies a substantial portion of the picture.

GEOGRAPHICAL AREA COVERED: Column headings refer to numbered areas outlined on the first map. Column entries indicate the areas included in the picture sequence.

METEOROLOGICAL AND OTHER FEATURES:

EXTRATROPICAL CIRCULATIONS - TABLE (1)

0. CLOUD VORTEX (Well Defined)
1. CLOUD VORTEX (Poorly Defined)
2. CLOUD VORTEX (With Frontal Band or Other Associated Band(s) )
3. CLOUD VORTEX (WITH DOUBLE CENTER)
4. CIRCULATION CENTER
- 5.
- 6.
- 7.
- 8.
9. CLOUD VORTEX (Unusual Appearance)

TROPICAL DISTURBANCES - TABLE (2)

0. Hurricane or TYPHOON (Named)
1. Tropical STORM (Named)
2. CLOUD VORTEX (Well Defined)
3. CLOUD VORTEX (Poorly Defined)
4. DISTURBED AREA (2° or less in extent)
5. DISTURBED AREA (2° to 4° in extent)
6. DISTURBED AREA (Over 4° in extent)
7. ASYMPTOTES OF CONVERGENCE
8. APPARENT ITC ZONE
- 9.



BANDS - TABLE (3)

0. PROBABLE FRONT (Well Defined)
1. PROBABLE FRONT (Poorly Defined)
2. APPARENT OCCLUDED FRONT
3. APPARENT STABLE OR OPEN WAVE
4. PROBABLE FRONT (With Cloud Vortex)
5. BAND, LOW LATITUDE (Within 15° of the Equator)
6. BAND, HIGH THIN CLOUDS (Possible Jet Association)
7. PRESUMED NON-FRONTAL
- 8.
9. BAND OF UNUSUAL APPEARANCE

CLOUD FEATURES - TABLE (5)

0. CUMULONIMBUS (No Apparent Organization)
1. CB's or other evidence of violent weather over the United States
2. CB's in apparent Squall Lines
3. EDDY PATTERNS
4. VORTICAL PATTERN IN A CELLULAR FIELD
5. MOUNTAIN WAVE CLOUDS
6. APPARENT GRAVITY WAVES (Not Obviously Associated with Terrain)
- 7.
- 8.
9. UNUSUAL CLOUD CONFIGURATION

CLOUD FEATURES - TABLE (4)

0. SOLID CELLS (Random)\*
  1. SOLID CELLS (Organized Pattern)\*
  2. HOLLOW POLYGONAL OR CRESCENT PATTERN\*
  3. VERMICULATED CLOUD PATTERN\*
  4. COASTAL STRATUS
  5. INLAND STRATUS OR FOG (Including Penetrating Coastal Stratus)
  6. CLOUD STREETS (Extratropical)
  7. CLOUD STREETS (Tropical)
  - 8.
  - 9.
- \*0, 1, 2 and 3 refer to homogeneous cloud field greater than 3° of great circle arc in diameter.

MISCELLANEOUS - TABLE (6)

0. ICE OR SNOW (Glacial)
1. SNOW (Non-Mountainous)
2. SNOW (Mountain)
3. ICE ON SEAS
4. ICE ON LAKES OR RIVERS
5. SUN GLINT
6. HAZE OR SMOG
7. PROBABLE CONTRAILS
8. LANDMARK OF EXCEPTIONAL QUALITY
9. LANDMARK, DISCERNIBLE

Following the listings is a series of maps which show the area covered by each sequence having usable frames and for which picture taking time has been determined. Most of the picture sequences were analyzed for their cloud content during routine operations, and these nephanalyses have been reproduced on the maps. When no nephanalysis for a usable sequence was available, and the area covered by the photographs could be reasonably determined, a generalized outline is shown instead. Maps showing nephanalyses and areas where pictures were taken are contained in this catalogue through April 1965. After April, because of the complete overlap of TIROS VII by TIROS IX, preparation of routine operational nephanalyses from TIROS VII pictures was discontinued. With complete photographic coverage available

from TIROS IX, only the listing of the cloud photograph sequences will be catalogued for TIROS VII after April 30, 1965. Satellite attitude and exposure time are not always accurately known at the time the nephanalyses are constructed. However, most of the nephanalyses are considered to be geographically accurate to about  $\pm 2^\circ$  with a few ranging from  $\pm 1^\circ$  to  $\pm 5^\circ$ . Users are cautioned not to attribute any greater accuracy to the location of cloud patterns shown.

The symbols used in the nephanalyses are defined by the following legend:

	CUMULOFORM CLOUD		STRATIFORM CLOUD
	CIRROFORM CLOUD		APPARENT CUGG OR CB
	BOUNDARY OF MAJOR CLOUD SYSTEMS - FRONTS, VORTICES, OR OTHER SYSTEM DOMINATING THE SCENE VIEWED BY THE SATELLITE		
	DEFINITE BOUNDARY OF MORE OR LESS UNORGANIZED CLOUD MASSES		
	INDEFINITE BOUNDARIES OF MORE OR LESS UNORGANIZED CLOUD MASSES		
	STRIATIONS		
	STRIATIONS, TENUOUS		
	CLOUD LINES		
	CLOUD LINES, TENUOUS - CLOUD FORM DENOTED BY		
	DIRECTION OF SHEAR OF CIRRUS - FROM CB ANVIL OR OTHER SOURCE		
	WAVE CLOUDS (MOUNTAIN OR TRANSVERSE)		
	ESTIMATED LOCATION OF JET STREAM - SHAFT MAY BE BROKEN TO AVOID OBSCURING SYMBOLS INSIDE NEPH BOUNDARY		
VORTEX		HEAVY	
		THIN	
<u>CLOUD AMOUNT</u>			
OPEN (O)	=	< 20% coverage	
MOSTLY OPEN (MOP)	=	20-50% coverage	
MOSTLY COVERED (MCO)	=	50-80% coverage	
COVERED (C)	=	> 80% coverage	

NOTE: STIPPLING WILL BE USED TO EMPHASIZE THE AREAS CONSIDERED BY THE ANALYST TO BE OF GREATEST SYNOPTIC SIGNIFICANCE.

The coverage swaths are grouped by PASS DAY, which includes all sequences taken on or near the series of 8 or 9 consecutive passes that come within range of the CDA stations each 24-hour period. These passes may fall on one or on two calendar days, and the maps are dated accordingly. Tape swaths are identified by the readout pass number, followed by the picture-taking pass number. Direct swaths are identified by a single pass number and the letter D. Midpoint time is given for all swaths, and camera number is added when necessary to identify definitely the sequence to which the swath applies. Two direct sequences acquired at the same station on the same pass are normally combined in one swath, since the short interruption for tape playback usually does not cause a significant gap in the coverage.

TIROS VII master films will be deposited at the National Weather Records Center (NWRC), Environmental Science Services Administration, Federal Building, Asheville, North Carolina. Persons or institutions desiring copies may order them from NWRC in the form of 35 mm. positive transparencies for projection or 35 mm. duplication negatives from which opaque prints can be made. The pictures are stored chronologically on 100-foot reels. Orders must be placed for one or more complete reels, at a cost of \$6.50 each, as it is not now possible to furnish copies of individual frames or to provide enlargements or other picture formats. All copies will be furnished with sprocket holes, since the necessary film emulsion is available only in this form.

A complete listing of satellite latitude, longitude, and height for all usable sequences, together with other information useful in determining precise location of TIROS VII pictures, will be available on microfilm from NWRC. Detailed listings of picture-taking time for all frames are contained on the "TIROS VII FRAME LOGS" which are on file at the Documentation Section, National Environmental Satellite Center, and will be made available on microfilm from NWRC.

Geographic locator grids, for overlay on the pictures, were computed at the CDA stations in the routine preparation of TIROS VII nephanalyses. Microfilm copies of these grids, which have latitude and longitude lines spaced at 5° intervals, are available from NWRC. The individual nephanalyses will also be available on microfilm.

Detailed descriptions of the problems and uncertainties encountered in geographically locating TIROS pictures are contained in References 1 and 2. Reference 4, on the other hand, describes a meticulous hand-rectification method which will produce excellent location information.

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1. Hubert, L. F.: "TIROS I Camera Attitude Data, Analysis of Location Errors, and Derivation of Correction for Calibration", Meteorological Satellite Laboratory Report No. 5, U. S. Weather Bureau, Washington, D. C., 1961.
2. Pyle, R. L. : "Documentation for TIROS IV Television Data", Meteorological Satellite Laboratory Report No. 16, U. S. Weather Bureau Washington, D. C., 1963.
3. : "Documentation for TIROS VII Television Data", now in preparation at National Environmental Satellite Center, Environmental Science Services Administration, Washington, D. C.
4. Fujita, T. : "A Technique For Precise Analysis For Satellite Data; Volume I - Photogrammetry", Meteorological Satellite Laboratory Report No. 14, U. S. Weather Bureau, Washington, D. C., 1963.

REEL	FILM LEGEND				PICTURE SEQUENCE DATA																		
	PASS	M	C	S	PICTURE TAKING			FRAME	GEOGRAPHICAL									METEOROLOGICAL AND OTHER FEATURES					
					PASS	MIDPOINT			AREA COVERED	EXTROP CIRC.	TROP. DISTURB.	BANDS	CLOUD FEATURES			MISCEL- LANEUS							
						DATE	TIME	TI					US	+	01		2	3	4	5	6	7	8
777A	8333	T	2	W	8332	0103	0130	30 32 32	1									13	01	04			
777A	8351	T	2	W	8350	0104	0647	30 32 32	1			9					7		0		9		
777A	8365	T	2	F	8362	0105	0218	30 32 32	1	5							10	0267	0				
777A	8377	T	2	P	8376	0106	0100	30 32 32	1	5					144	58	015	17	249				
777A	8405	T	2	W	8404	0107	2232	30 31 31	1	5							8	1	07	0			
777A	8420	T	2	W	8419	0108	2254	30 32 32	1	5							68	0	07	0			
777A	8421	T	2	P	8420	0109	0035	30 32 32	1	5					4	78	156	67	24				
777A	8435	T	2	W	8434	0109	2315	30 32 32	1	5	7					68		07	0	9			
777A	8449	T	2	W	8448	0110	2200	30 32 32	1	5	7					8	0	0	0	9			
778A	8450	T	2	P	8449	0110	2335	30 32 32	1	5					0	8	15	167	24				
778A	8451	T	2	P	8450	0111	0117	30 32 32	1	5						785	15	7	24				
778A	8463	D	1	W	8463	0111	2053	10 04 04			4						0	6					
778A	8464	T	1	W	8463	0111	2222	30 32 32	1	5	7					8		0467	0	9			
778A	8465	T	1	P	8464	0111	2358	30 32 32	1	5					4	478	057	17	29				
778A	8497	T	2	F	8496	0114	0400	30 31 31	1	5		9				8	1	0357	0				
778A	8498	T	2	F	8497	0114	0537	30 32 32	1	5		9				68		036	0	9			
778A	8507	D	2	W	8507	0114	2019	30 02 02			4	7					16						
778A	8508	T	2	W	8507	0114	2150	30 32 32	1	5	7					8	9	0	0				
778A	8509	T	2	P	8508	0114	2324	30 32 32	1	5						8	0	067	0				
778A	8511	T	2	F	8509	0115	0107	30 32 32	1	5					1	8	01	27	0				
778A	8512	T	2	F	8511	0115	0422	30 31 31	1	5		9				8	1	367	0				
778A	8513	T	2	F	8512	0115	0558	30 32 32	1	5		9				68		37	05				
778A	8527	T	2	F	8527	0116	0443	30 16 16	1	5						8							
778A	8528	T	2	P	8527	0116	0621	30 32 32	1	3	5					8		07	03	129			
778A	8540	T	2	F	8537	0116	2236	30 32 32	1	5	7							457	0	29			
778A	8542	T	2	F	8541	0117	0506	30 32 32	1	3	5					6	1	17	0	28			
779A	8543	T	2	P	8542	0117	0643	30 32 32	1	3	5					8		07	0	19			
779A	8555	T	2	F	8554	0118	0212	30 32 32	1	5						8	0	1	0				
779A	8556	T	2	F	8555	0118	0350	30 32 32	1	5						8	1	3012	0				
779A	8557	T	2	P	8556	0118	0525	30 32 32	1	3	5					8		07	0	9			
779A	8558	T	2	P	8557	0118	0704	30 32 32	1	3					4	8		78	8	29			
779A	8566	T	2	W	8563	0118	1648	30 32 32			4	8						6	0				
779A	8569	T	2	F	8567	0118	2150	30 23 23			5	7						4	0	129			
779A	8570	T	2	F	8569	0119	0232	30 32 32	1	5						58		23	0				
779A	8571	T	2	F	8570	0119	0410	30 32 32	1	5						268		0	0	9			
779A	8572	T	2	P	8571	0119	0547	30 32 32	1	3	5					8		7		1259			
779A	8582	T	2	P	8578	0119	1710	30 32 32			4	8						06	67	8			
779A	8582	O	2	P	8582	0119	2206	30 04 04			5	7					03	64		79			
779A	8584	T	2	F	8583	0120	0117	30 32 32	1	5						6		05	03	0			
779A	8585	T	2	F	8584	0120	0254	30 31 31	1	5						8	1	037	0				
779A	8586	T	2	F	8585	0120	0432	30 32 32								8	07	756	056	158			
779A	8587	T	2	P	8586	0120	0610	30 37 32	1	3								7	0	9			
779A	8594	T	2	W	8592	0120	1553	30 32 32			4	8					07	567	0				
779A	8594	O	2	W	8594	0120	1733	30 06 06			4						1	6	0				
780A	8595	T	2	W	8594	0120	1902	30 32 32	1		7								0				
780A	8595	O	2	W	8595	0120	1915	30 04 04				7					1	7					
780A	8596	T	2	P	8595	0120	2035	30 32 32	1	5					2	58		17	09				
780A	8596	O	2	P	8596	0120	2047	30 05 05			5	7					0	15		9			
780A	8599	T	2	W	8597	0120	0000	30 32 32	1							8		07	12	04			
780A	8599	T	1	W	8598	0121		30 32 32			5												
780A	8600	T	2	F	8599	0121	0315	30 32 32	1	5						087	036	0167	0263	59			
780A	8601	T	2	F	8600	0121	0453	30 32 32	1	3	5					8		67	02	1258			
780A	8609	T	2	W	8606	0121	1438	30 32 32			4	8						06	67	0			
780A	8609	D	2	W	8609	0121	1757	30 08 08			4	7						67	0	129			
780A	8610	T	2	P	8609	0121	1920	30 32 32	1	5					4	57		05	27	5			
780A	8610	D	2	P	8610	0121	1930	30 01 01			5	7						6	0	9			
780A	8611	T	2	P	8610	0121	2100	30 31 31	1	5						836		5	2	5			
780A	8611	O	2	P	8611	0121	2110	30 03 03			5	7			1			3	4	9			
780A	8613	T	2	W	8611	0121	2245	30 32 32	1	5					4			036	12	04			
780A	8614	T	2	F	8614	0122	0200	30 32 32			5				4	16		176	067	02			
780A	8660	T	2	P	8660	0125	0440	30 31 31	1	3						8		6	7	5			
780A	8667	T	2	W	8662	0125	0932	30 32 32			23	6			4				0	1249			
780A	8667	D	2	W	8667	0125		30 01 01												8			
780A	8667	D	1	W	8667	0125	1609	V 09 09				7											
780A	8669	T	2	P	8667	0125	1740	30 31 31			5	7			1	8		05	17	2	59		
780A	8669	O	2	P	8669	0125	1918	30 05 05			5	7						06	26	9			
780A	8674	T	2	P	8671	0125	2232	30 31 31			5				2	8		16	2				
781A	8683	T	2	P	8677	0126	0815	30 32 32	3	6					0	68		6	0	138			
781A	8688	T	2	P	8686	0126	2253	30 32 32			5				13			0	267	9			
781A	8697	T	2	W	8691	0127	0659	30 32 32	3	6													
781A	8697	O	2	W	8697	0127	1650	10 15 15				7											
781A	8703	T	2	P	8699	0127	1959	30 31 31			5	7				8		17	7	0	9		
781A	8712	T	2	P	8706	0128	0721	30 32 32	3	6						5		16	4	05	138		
781A	8715	T	2	W	8714	0128	2019	30 32 32			5												
781A	8718	T	2	P	8717	0129	0112	30 31 31	1	3	5				4	8		016	27	18			
781A	8727	T	2	P	8720	0129	0604	30 32 32	3	6								1		9			
781A	8727	O	1	P	8727	0129	1726	30 04 04			5	7				5			45	23	8		
781A	8730	T	1	W	8729	0129		30 31 31													</		



REEL	FILM LEGEND	PICTURE SEQUENCE DATA														
		PICTURE TAKING			FRAME	GEOGRAPHICAL AREA COVERED				METEOROLOGICAL AND OTHER FEATURES						
										EXTROP CIRC.	TROP. DISTURB.	BANDS	CLOUD FEATURES		MISCELLANEOUS	
		PASS	DATE	TIME		TI	US	+	0				1	2		3
PASS	M	C	S	PASS	DATE	TIME	TI	US	+	0	1	2	3	4	5	6
781A	8745	T	1	W	8741	0130	1747	30	31	31	1	5	7			
781A	8747	T	1	P	8746	0131	0017	30	32	32	3	5				
781A	8755	T	1	W	8748	0130	0508	30	32	32						912
781A	8755	O	1	W	8755	0130	1459	10	27	27	4	7				912
782A	8759	T	1	W	8756	0130	1807	30	32	32						19
782A	8761	T	1	P	8760	0131	2300	30	32	32	1	5				
782A	8762	T	1	P	8762	0201	0215	30	32	32	1	3				
782A	8774	T	1	W	8763	0201	0529	30	32	32	1	3				9
782A	8784	O	1	W	8784	0202	1359	30	03	03			7			
782A	8786	O	1	P	8786	0202	1714	30	02	02	5					
782A	8798	O	1	W	8798	0203	1243	30	04	04						
782A	8818	T	2	W				30	22	22						
782A	8847	T	1	F		0206		30	13	13						
782A	8888	T	2	P	8881	0209	0404	30	19	04	1	5				
782A	8892	T	1	F	8890	0209		30	31	31						
782A	8892	T	2	F		0209		30	32	32						
782A	8893	T	1	P	8892	0209	2144	30	31	31	1	4	7			
782A	8902	T	1	P	8896	0210	0416	30	31	31	1	5				92
782A	8903	T	1	P	8902	0210	1359	30	32	32			56			
782A	8906	T	1	F	8905	0210	1853	30	32	32			4			28
782A	8906	O	1	F	8906	0210	2017	10	09	09			5	7		
782A	8908	T	1	P	8907	0210	2209	30	32	32			45	7		
783A	8917	T	1	P	8911	0211	0437	30	32	32	3	5				29
783A	8920	T	1	F	8917	0211	1422	30	32	32	1			8		
783A	8921	T	1	F	8920	0211	1915	30	32	32						
783A	8922	T	1	P	8921	0211	2052	30	32	32			4	7		19
783A	8931	T	1	P	8923	0211	0007	30	32	32			5			
783A	8935	T	1	W	8931	0212	1308	30	32	32			34	6		
783A	8935	O	1	W	8935	0212	1932	30	03	03			7			
783A	8935	O	1	W	8935	0212	1936	30	06	06			4	7		
783A	8937	T	1	P	8936	0212	2114	30	31	31			4	7		
783A	8946	T	1	P	8938	0213	0029	30	32	32	1	5				
783A	8949	T	1	F	8946	0213	1328	30	32	32						
783A	8950	O	2	W	8950	0213	1958	10	13	13			4	7		
783A	8951	T	1	P	8949	0213	1821	30	32	32	2	4	7			
783A	8952	T	1	P	8951	0213	2140	30	32	25	1	5	78			9
783A	8961	T	1	P	8953	0214	0050	30	32	32	1	5				9
783A	8964	O	2	W	8964	0214	1836	30	04	04			7			
783A	8965	T	1	F	8965	0214	2021	30	32	32						
783A	8966	T	1	P	8965	0214	2021	30	32	32			4	78		19
783A	8974	T	1	W	8967	0214	2334	30	32	32	1	5				
784A	9025	T	1	P	9025	0218	2142	30	01	01			5	7		29
784A	9141	T	1	P	9139	0226	1503	30	31	23	2	4	8			9
784A	9154	T	1	W	9141	0226	1818	30	32	25	12		8			
784A	9156	T	1	P	9154	0227	1522	30	32	26	2	4	8			9
784A	9169	T	1	F	9168	0228	1510	30	32	32						
784A	9171	T	1	P	9169	0228	1542	30	31	28	2	4	8			9
784A	9183	O	1	W	9183	0301	1409	30	15	00						
784A	9183	T	1	W	9171	0228	1856	30	31	31						
784A	9185	T	1	P	9183	0301	1424	30	32	30	2	4	8			9
784A	9197	T	1	W	9185	0301	1730	30	21	21	1	5				
784A	9200	T	1	P	9197	0302	1320	30	32	32	2					
784A	9211	T	1	W	9200	0302	1801	30	32	32	1	5				
784A	9212	T	1	W	9211	0303	1201	30	32	32	2					
784A	9213	T	1	F	9212	0303	1321	30	30	30						
784A	9226	O	1	W	9226	0304	1157	10	10	00						
784A	9226	T	1	W	9214	0303	1645	30	32	32	1	5				
784A	9227	T	1	W	9226	0304	1213	30	32	32	2	4				
785A	9229	T	1	P	9227	0304	1350	30	32	32	2	4	8			9
785A	9239	T	1	P	9229	0304	1706	30	32	32	1	5	8			9
785A	9241	T	1	W	9239	0305	0919	30	32	32	0	2				
785A	9243	T	1	P	9241	0305	1234	30	32	32	2	4	8			95
785A	9253	T	1	P	9243	0305	1549	30	32	32	1	5	8			9
785A	9255	T	1	W	9253	0306	0803	30	32	32						
785A	9256	T	1	W	9255	0306	1117	30	32	32	23	6				
785A	9258	T	1	P	9256	0306	1255	30	32	32	2	4	8			59
785A	9267	T	1	P	9258	0306	1610	30	32	32	1	5	8			9
785A	9270	T	1	W	9267	0307	0647	30	32	32	12	6				
785A	9271	T	1	W	9270	0307	1137	30	32	32	2	4				
785A	9272	T	1	P	9271	0307	1315	30	32	32	2	4	8			95
785A	9273	T	1	P	9272	0307	1452	30	32	32	1	4	8			258
785A	9282	T	1	P	9273	0307	1630	30	32	32	1	5				
785A	9284	T	1	W	9282	0308	0706	30	32	32	12	6				
785A	9285	T	1	W	9284	0308	1022	30	32	32	2	6				
786A	9287	T	1	P	9285	0308	1158	30	32	32	2	4	8			9
786A	9296	T	1	P	9287	0308	1513	30	32	32	1	5				9
786A	9299	T	1	W	9296	0309	0551	30	32	32	1	6				
786A	9300	T	1	W	9299	0309	1044	30	32	32	23	6				
786A	9302	T	1	P	9300	0309	1221	30	32	32	2	4	8			9
786A	9311	T	1	P	9302	0309	1536	30	32	32	1	5				5
786A	9314	J	2	W	9311	0310	0613	30	32	32	12	6				

REEL	FILM LEGEND	PICTURE SEQUENCE DATA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		PICTURE TAKING					FRAME	GEOGRAPHICAL AREA COVERED	METEOROLOGICAL AND OTHER FEATURES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
									EXTROP CIRC.	TROP. DISTURB	BANDS	CLOUD FEATURES		MISCEL-LANEUS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		PASS	DATE	TIME	TI	US	+	01				2	3		4	5	6	7	8	9	TABLE (1)	TABLE (2)	TABLE (3)	TABLE (4)	TABLE (5)	TABLE (6)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
786A	9315 T 2 W	9314	0310	1105	30	28	28	4 8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</

REEL	FILM LEGEND	PICTURE SEQUENCE DATA													
		PICTURE TAKING			FRAME	GEOGRAPHICAL	METEOROLOGICAL AND OTHER FEATURES								
		PASS	MIDPOINT				AREA COVERED	EXTROP CIRC.	TROP. DISTURB.	BANDS	CLOUD FEATURES		MISCELLANEOUS		
			DATE	TIME							TI	US		+	TABLE (1)
	PASS M C S	PASS	DATE	TIME	TI	US	+	01 2 3 4 5 6 7 8 9	TABLE (1)	TABLE (2)	TABLE (3)	TABLE (4)	TABLE (5)	TABLE (6)	
790A	9591 T 2 W	9590	0329	0356	30	32	32	8							
790A	9592 T 2 W	9591	0329	0531	30	32	32	9							
791A	9593 T 2 P	9592	0329	0709	30	32	32	1 3 5		8	0	67	0	9	
791A	9594 T 2 P	9593	0329	0846	30	32	32	1 3		8		67	05	29	
791A	9601 O 2 W	9601	0329	1018	30	07	07								
791A	9601 T 2 W	9594	0329	1024	30	32	32	1 3							
791A	9602 T 2 W	9601	0329	2145	30	31	31	3							
791A	9602 O 1 W	9602	0329	2156	30	04	04	7							
791A	9603 T 2 P	9602	0329	2323	30	32	32	1 5		8		674	0	9	
791A	9606 T 2 F	9604	0330	0103	30	23	23								
791A	9608 T 2 P	9607	0330	0557	30	32	32	1 5	20	68	40	67	02	9	
791A	9616 T 2 W	9615	0330	2025	30	32	30	8							
791A	9616 O 2 W	9616	0330	2040	30	09	09	4 7							
791A	9620 T 2 W	9616	0330	2200	30	31	31	1 5							
791A	9622 T 2 P	9621	0331	0614	30	32	32	1 3 5	4	8		76	0	9	
791A	9623 T 2 P	9622	0331	0752	30	32	32	1 3		58			50	9	
791A	9630 T 2 W	9623	0331	0924	30	32	28	123 6							
791A	9635 T 2 F	9635	0401		30	08	08								
791A	9636 T 2 F	9635	0401	0458	30	32	32								
791A	9637 T 2 P	9636	0401	0636	30	32	32	1 3		2	1		50	9	
791A	9645 T 2 W	9637	0401	0809	30	32	29	1 3							
791A	9645 O 2 W	9645	0401	1941	30	03	03	4 7			1		0	9	
792A	9651 T 2 F	9650	0402	0517	30	31	31								
792A	9652 T 2 P	9651	0402	0656	30	32	32	1 3		86		67	50	9	
792A	9660 T 2 W	9652	0402	0831	30	32	32	12 6							
792A	9661 O 2 P	9661	0402	2137	30	04	04	5 7				6		58	
792A	9665 T 2 F	9664	0403	0404	30	32	32	9							
792A	9666 T 2 P	9665	0403	0538	30	32	31	1 3		85	1	67	0	9	
792A	9667 T 2 P	9666	0403	0712	30	32	28	1 3		8	1	67	0	9	
792A	9674 T 2 W	9667	0403	0852	30	32	32	123 6							
792A	9674 O 2 W	9674	0403	1847	30	03	03	4 7					0	9	
792A	9676 T 2 P	9675	0403	2143	30	31	30	1 5		8		67	0		
792A	9679 T 2 F	9676	0403	2331	30	32	32								
792A	9680 T 2 F	9679	0404	0426	30	32	32								
792A	9681 T 2 P	9680	0404	0557	30	32	29	1 3	4	8	1	67	0	9	
792A	9689 T 2 W	9681	0404	0734	30	32	28	1 3						8	
792A	9689 O 2 W	9689	0404	1907	30	02	02	4 7			1		01	8	
792A	9690 T 2 P	9689	0404	2032	30	32	29	1 5		8	1	67	0		
792A	9691 T 2 P	9690	0404	2331	30	25	24	1 5		8	16	67	0		
792A	9695 T 2 P	9692	0404	2356	30	32	32	1 5		8	1	67	0		
792A	9696 T 2 P	9695	0405	0622	30	32	32	1 3	1	8		67	0	9	
792A	9704 T 2 W	9696	0405	0759	30	32	32	123 6						9	
793A	9705 T 2 P	9704	0405	2058	30	32	32	1 5 7		8	1	067	0	9	
793A	9706 T 2 P	9705	0405	2236	30	32	32	1 5	2	8	1	0267	0		
793A	9709 T 2 F	9708	0406	0329	30	32	32								
793A	9710 T 2 P	9709	0406	0507	30	32	32	1 3			1		0	9	
793A	9719 T 2 P	9710	0406	0645	30	32	32	1 3		4		7		29	
793A	9720 T 2 P	9719	0406	2117	30	32	32	1 5	4	5	156	12	40		
793A	9722 T 2 W	9722	0407	0038	30	32	32	1 5		5	1		0		
793A	9723 T 2 W	9723	0407	0216	30	32	32	1 5 7	2		023	0137	02		
793A	9734 O 1 P	9734	0407	2006	30	01	01	5				6			
793A	9735 T 1 P	9734	0407	2137	30	31	31	1 5		8	1	672	0		
793A	9737 T 1 W	9736	0407	2322	30	32	32	1 5		7	0	07	02		
793A	9738 T 1 W	9738	0408	0236	30	32	32	1 5	0		0	6	0	5	
793A	9739 T 1 P	9738	0408	0405	30	32	32	1 3		5	1	4	025	18	
793A	9740 T 1 P	9739	0408	0543	30	32	32	1 3	4	5			0	82	
793A	9749 T 1 P	9748	0408	2019	30	32	32	1 5			76	2	2		
793A	9754 T 1 P	9750	0408	2205	30	32	32	1 5 7	4	8	16	126	0	9	
793A	9764 T 1 P	9763	0409	2042	30	32	32	1 5		8		267	0		
794A	9768 T 1 P	9764	0409	2225	30	32	32	1 5		8	0	07	0		
794A	9769 T 1 P	9768	0410	0455	30	32	32	1 3						5129	
794A	9782 T 1 F	9778	0410	2107	30	32	32	1 5		8		03	0		
794A	9782 T 2 F	9780	0410	2247	30	32	32	1 5		8	0	02	0		
794A	9783 T 1 P	9783	0411	0339	30	30	30	1 3		54	16		25	9	
794A	9792 T 1 P	9782	0411	0342	30	03	03	1 3							
794A	9793 T 1 P	9792	0411	1922	30	32	32	1 5		85	1	672	0		
794A	9797 T 1 F	9793	0411	2130	30	32	32	1 5		84	0	0	0		
794A	9798 T 1 P	9797	0412	0400	30	32	32	1 3		8		7	0	259	
794A	9810 T 1 F	9808	0412	2151	30	31	31	1 5		68	0	017	0		
794A	9811 T 1 W	9811	0413	0106	30	32	32	1 5							
794A	9812 T 1 P	9812	0413	0244	30	32	32	1 3		85	16	67	0	259	
794A	9822 T 1 P	9821	0413	1852	30	32	32	1 5		85	1	076	0		
794A	9826 T 1 F	9823	0413	2035	30	32	32	5	0	5		0167	02	9	
794A	9826 T 2 F	9824	0413	2212	30	31	31	5		8	0	06	0		
794A	9839 T 1 W	9835	0414	1741	30	31	31	5 7	2		1	0	0		
794A	9839 T 2 W	9837	0414	1926	30	30	30	5 7				0	05	2	
794A	9840 T 1 W	9840	0415	0011	30	32	32	1 5		6	0		0		
795A	9841 T 1 F	9841	0415	0150	30	32	32	1 3		5	1	7	0	128	
795A	9850 T 1 W	9849	0415	1620	30	32	32	1 5 7				0	0	92	
795A	9853 T 1 W	9851	0415	1939	30	32	32								
795A	9854 T 1 W	9854	0415	2254	30	32	32	1 5					04		



REEL	FILM LEGEND				PICTURE							SEQUENCE										DATA							
	PASS	M	C	S	PICTURE TAKING			FRAME		GEOGRAPHICAL AREA COVERED		METEOROLOGICAL AND OTHER FEATURES																	
					PASS	MIDPOINT		TI	US	+	O	I	2	3	4	5	6	7	8	9	TABLE (1)	TABLE (2)	TABLE (3)	CLOUD FEATURES		MISCEL- LANEQUIS	TABLE (6)		
						DATE	TIME																	TABLE (4)	TABLE (5)				
795A	9855	T	1	F	9854	0416	0031	30	32	32		3	5					5	0	046	0								
795A	9856	T	1	F	9855	0416	0209	30	32	32		1	3					8	1	046	0								258
795A	9865	T	2	W	9864	0416	1641	30	32	32		1	5	7						50									2459 8
795A	9869	T	1	W	9866	0416		30	12	11																			
795A	9869	T	2	W	9867	0416	2007	30	32	32			5	7															924
795A	9870	T	1	F	9869	0417	0052	30	32	32		1	3				8	06	06	0									258
795A	9871	T	1	F	9870	0417	0230	30	31	31		3							0	0									2458
795A	9879	T	1	W	9878	0417	1527	30	31	30		1	45	7															9
795A	9883	T	1	W	9880	0417	1706	30	32	32		1	5	7			8	6	04										9
795A	9883	T	2	W	9881	0417	1850	30	32	32			5	7		1		7	1	0									912
795A	9884	T	2	W	9884	0417	2332	30	15	15		1	5																
795A	9893	T	2	W	9891	0418	1235	30	31	31			4	8		4		0	03	0									9
795A	9893	D	2	W	9893	0418	1415	30	02	02			4	7					4										9
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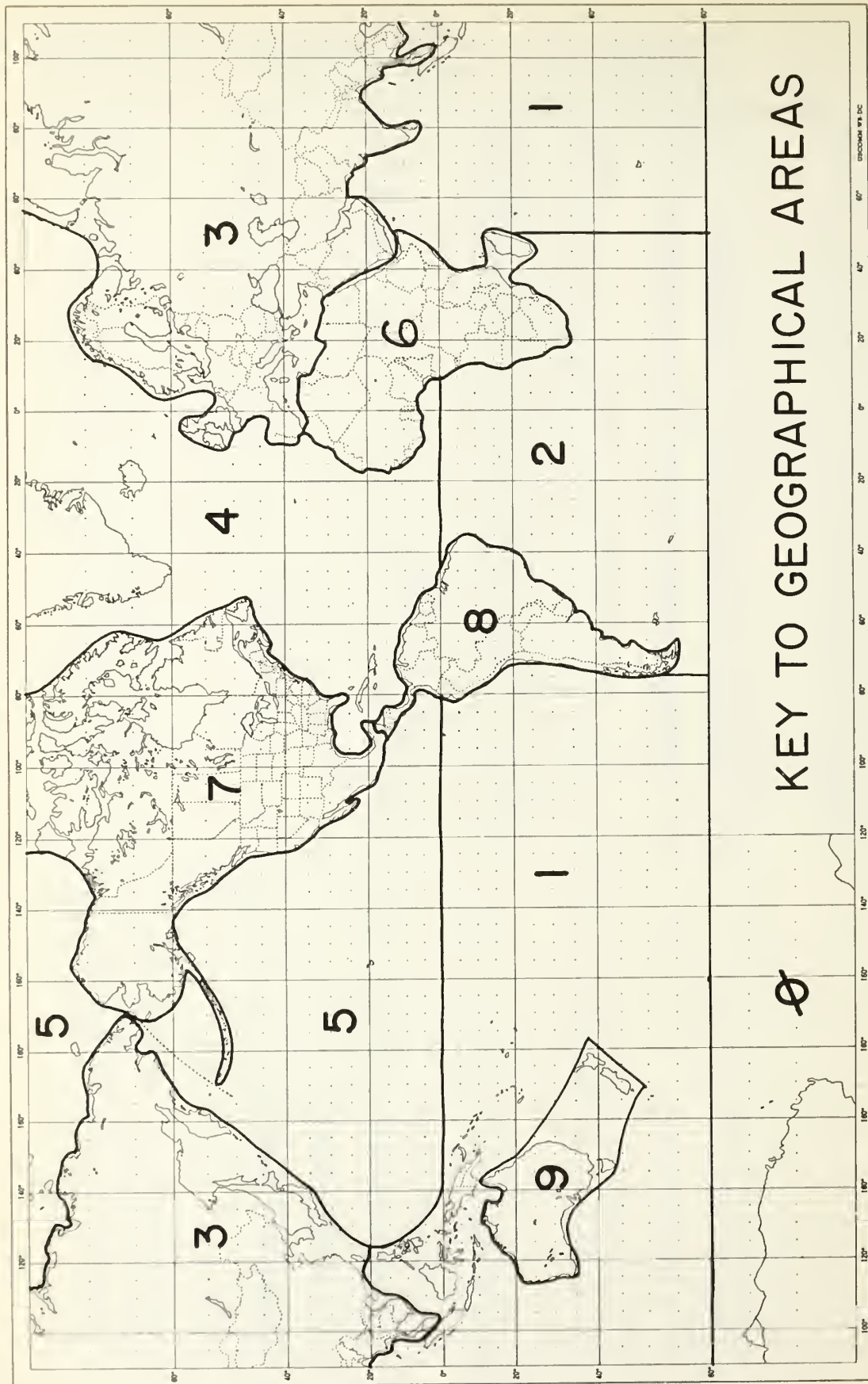


REEL	FILM LEGEND				PICTURE SEQUENCE DATA																						
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						DATE	TIME																		TABLE (4)	TABLE (5)	
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701B	0146	T	2	W	0145	0505	1551	30 32 32	2 4 7									8	0	0	0	9					
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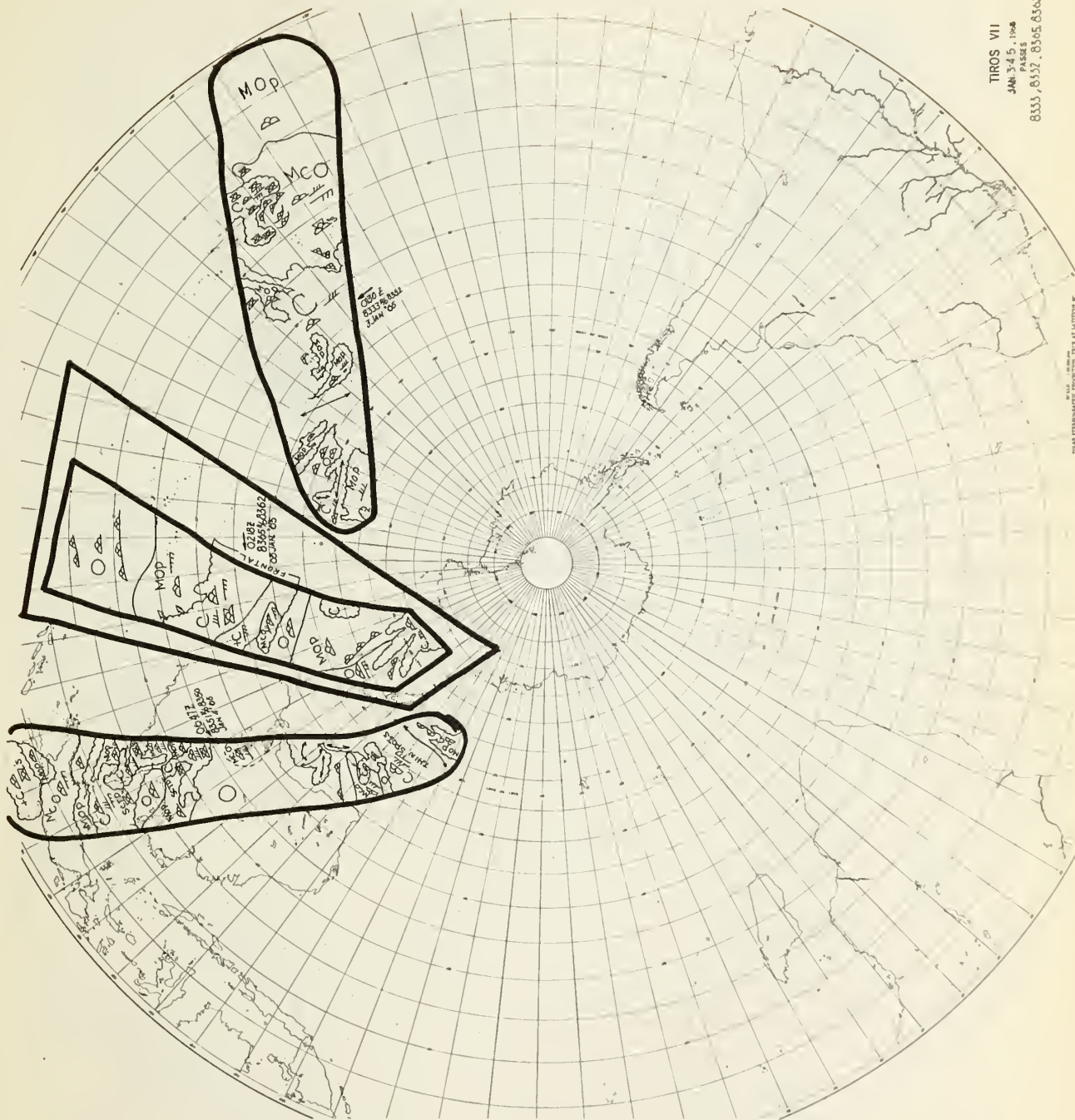
REEL	FILM LEGEND	PICTURE SEQUENCE DATA													
	PASS M C S	PICTURE TAKING			FRAME TI US +	GEOGRAPHICAL AREA COVERED 01 2 3 4 5 6 7 8 9	METEOROLOGICAL AND OTHER FEATURES								
		PASS	MIDPOINT				EXTROP CIRC. TABLE (1)	TROP. DISTURB TABLE (2)	BANDS TABLE (3)	CLOUD FEATURES TABLE (4) TABLE (5)		MISCEL- LANEOUS TABLE (6)			
			DATE	TIME											
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REEL	FILM LEGEND	PICTURE SEQUENCE DATA																			
	PASS M C S	PICTURE TAKING			FRAME TI US +	GEOGRAPHICAL AREA COVERED 01 2 3 4 5 6 7 8 9	METEOROLOGICAL AND OTHER FEATURES														
		PASS	MIDPOINT				EXTROP CIRC.	TROP. DISTURB.	BANDS	CLOUD FEATURES		MISCEL- LANEOUS									
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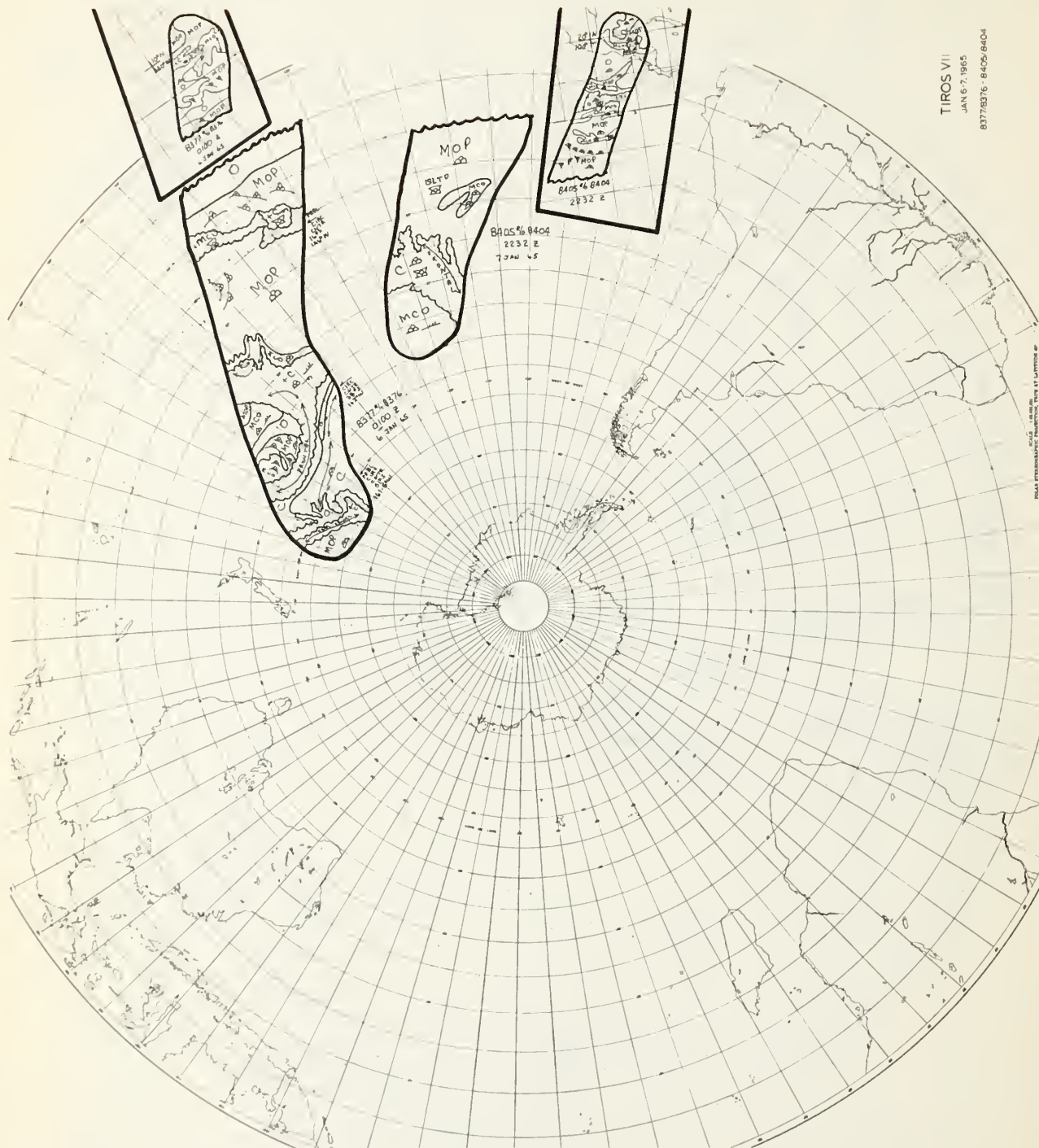






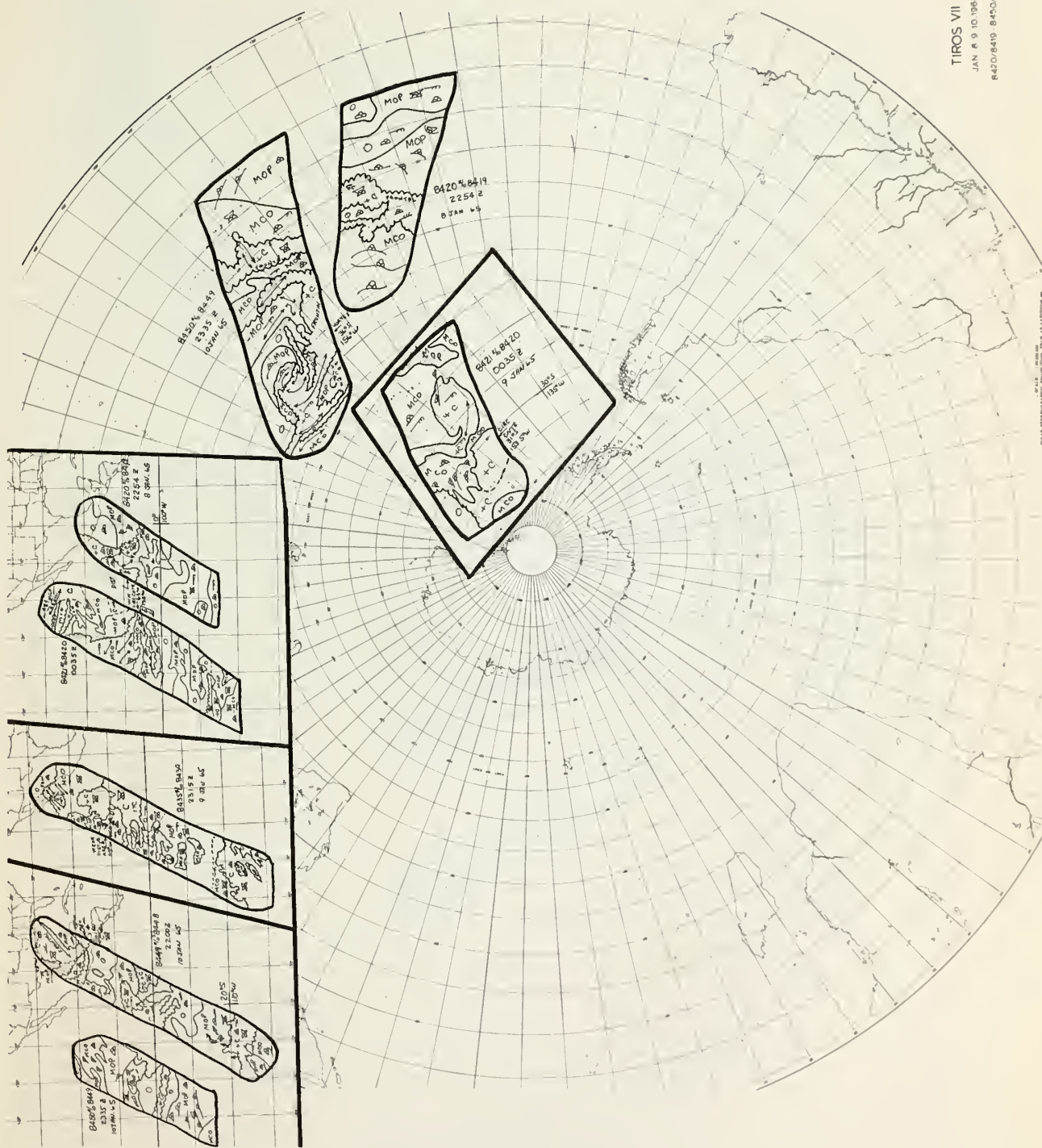


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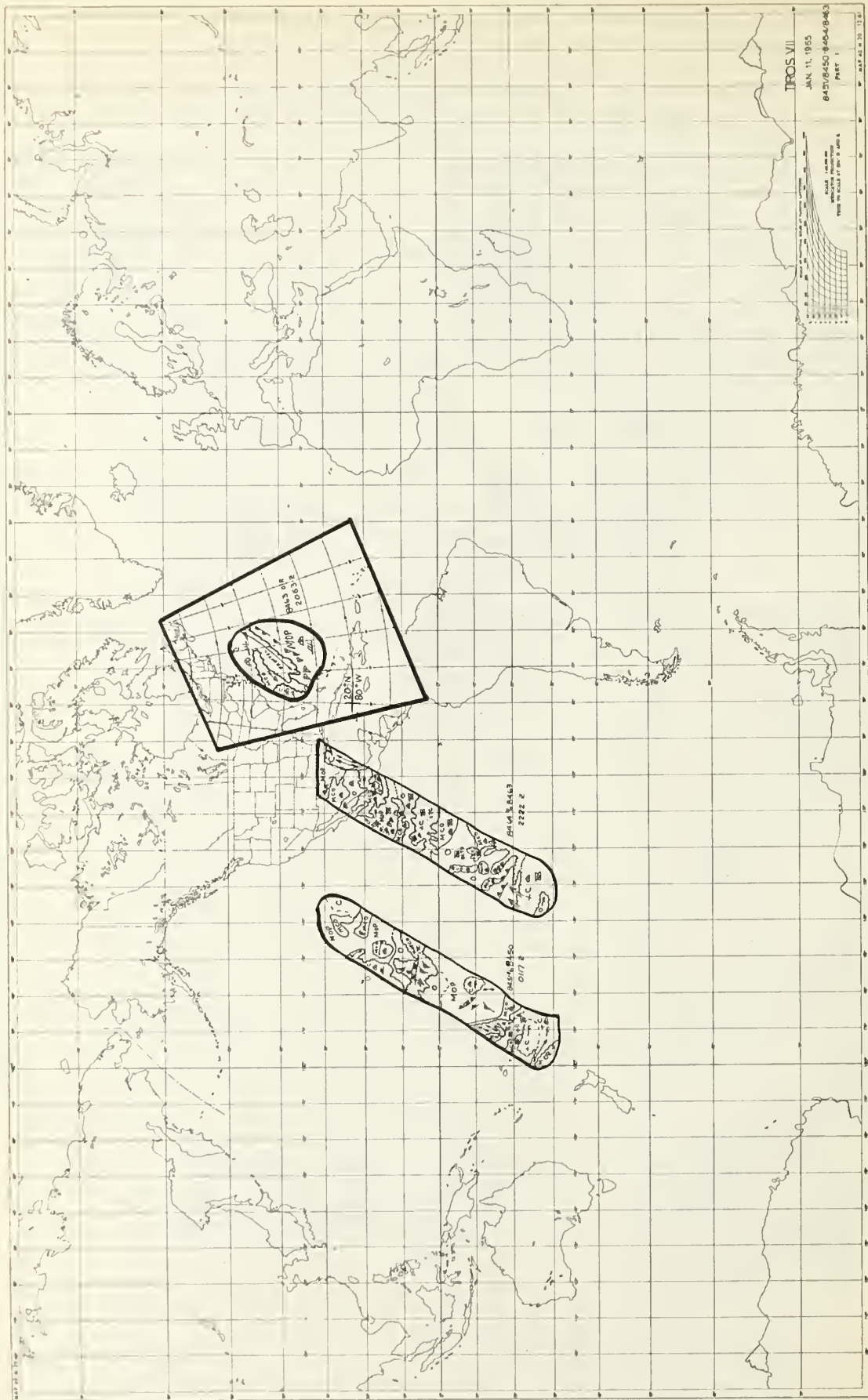
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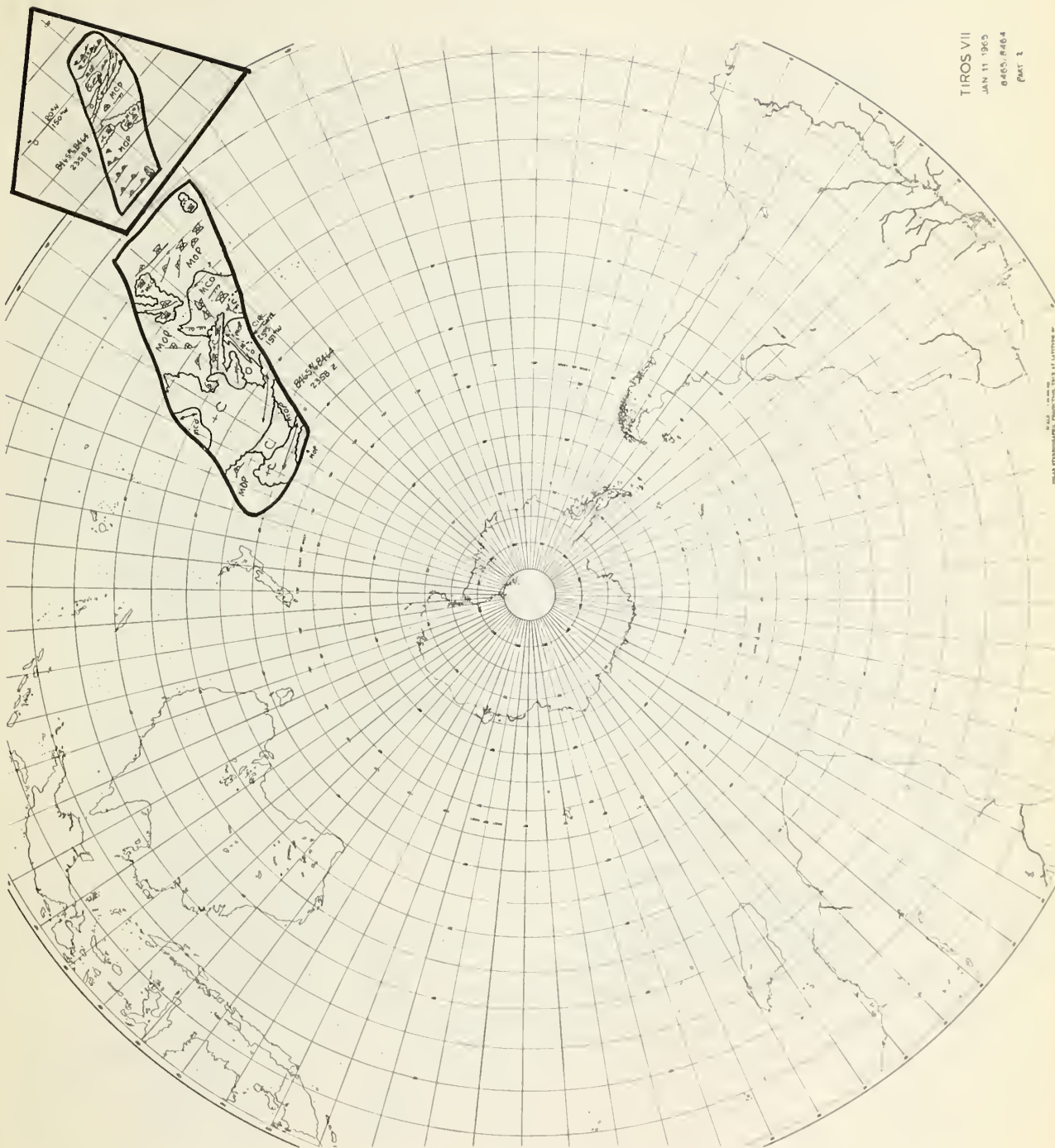
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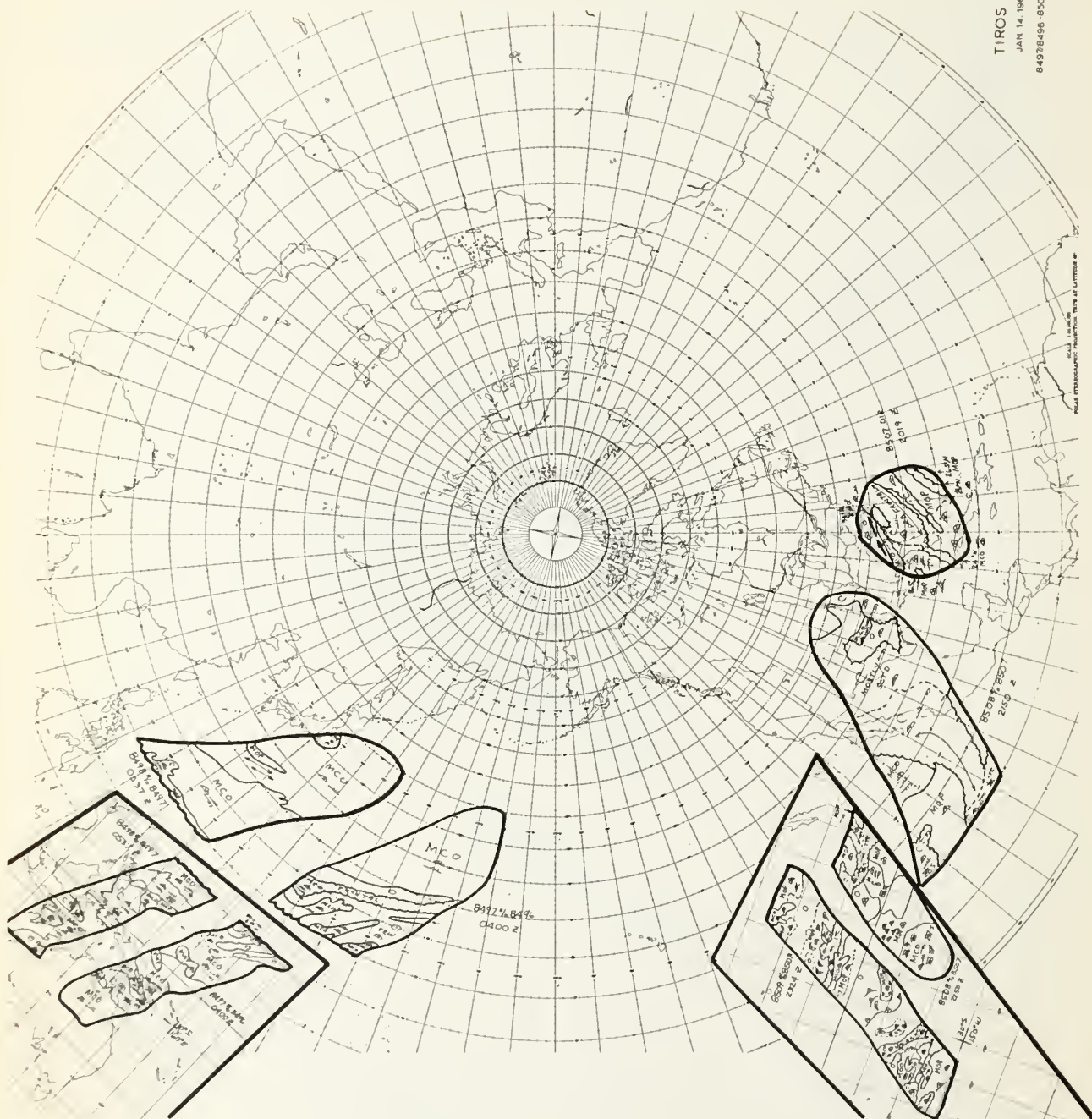




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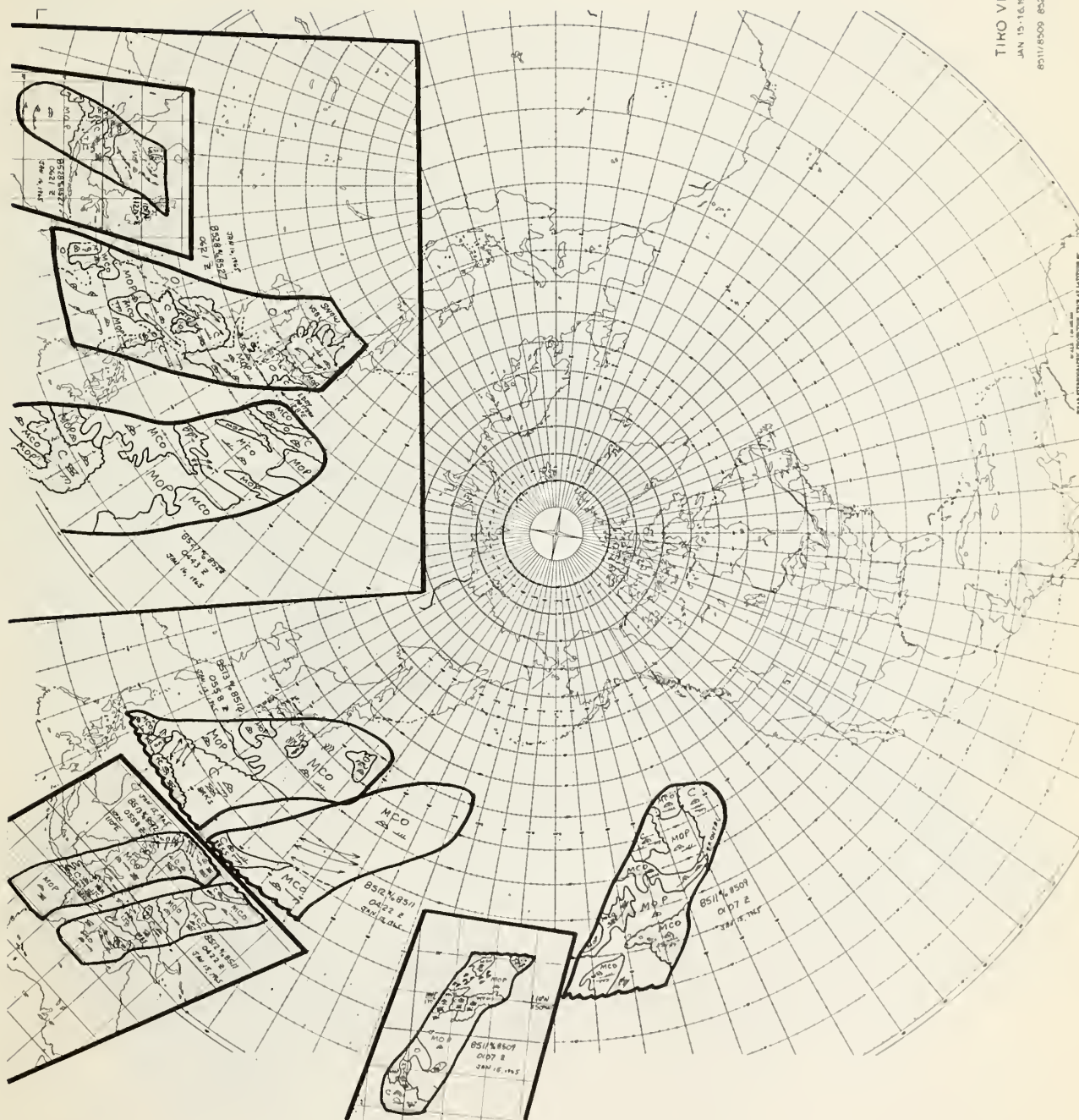


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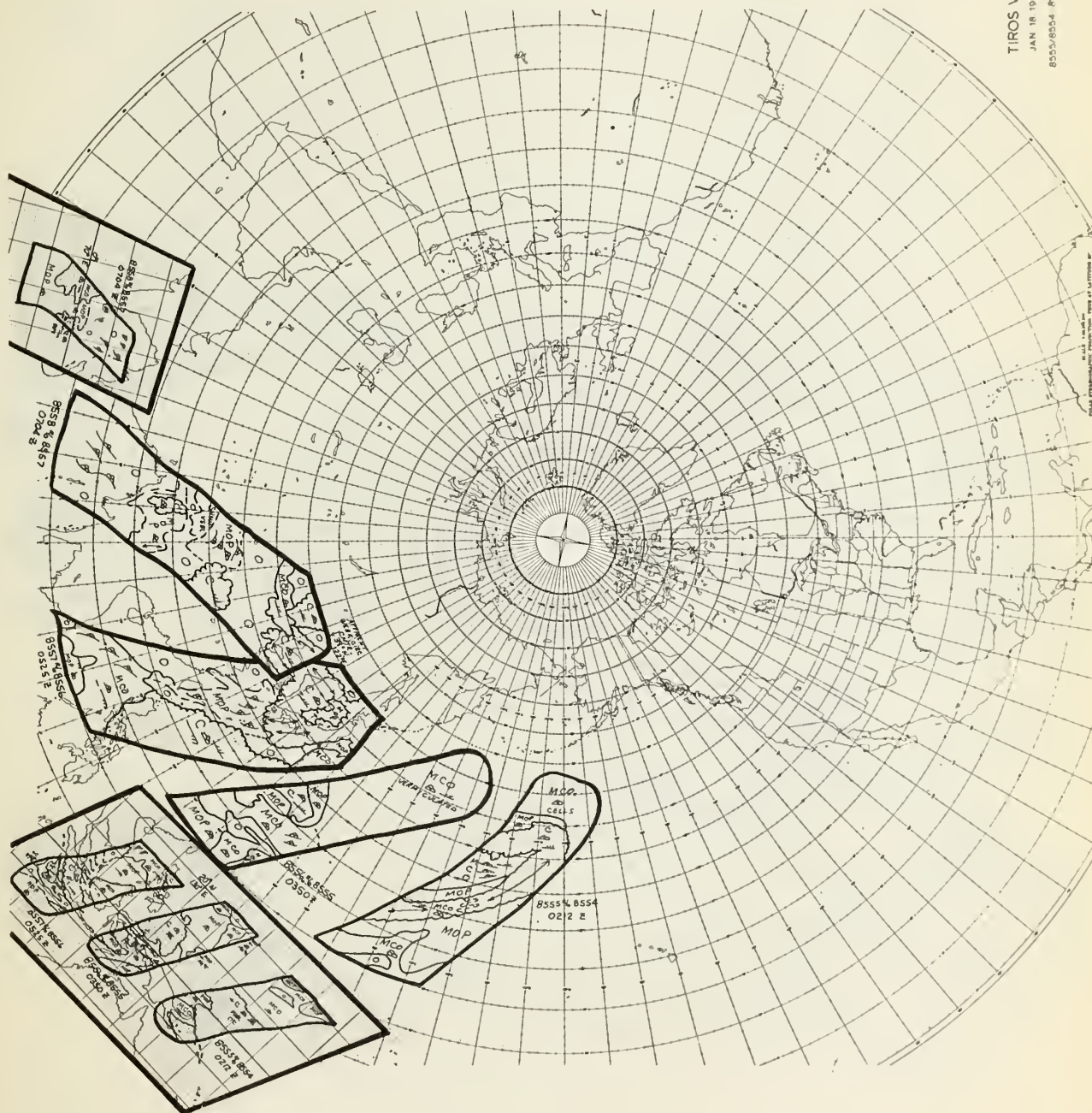


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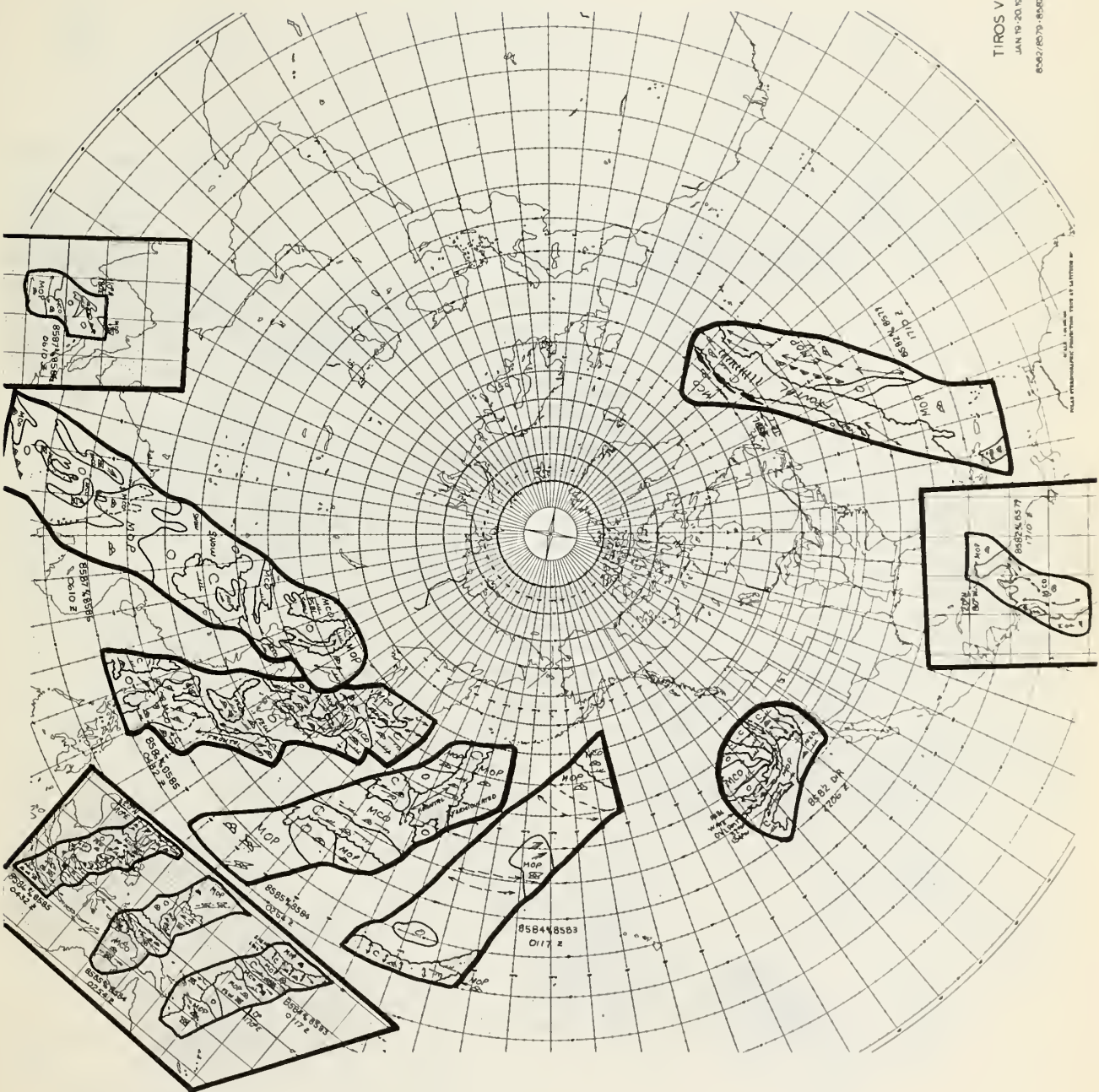




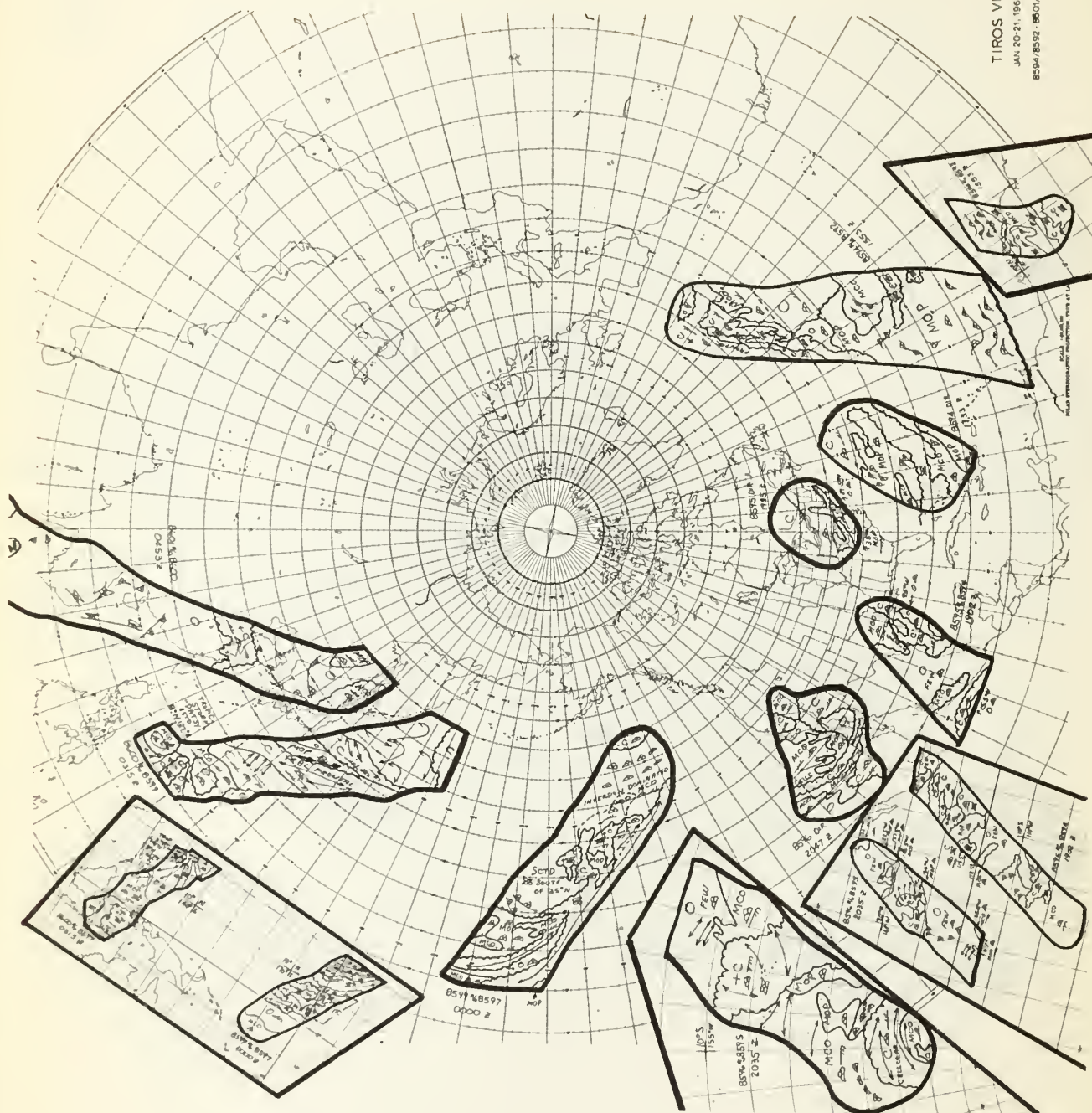
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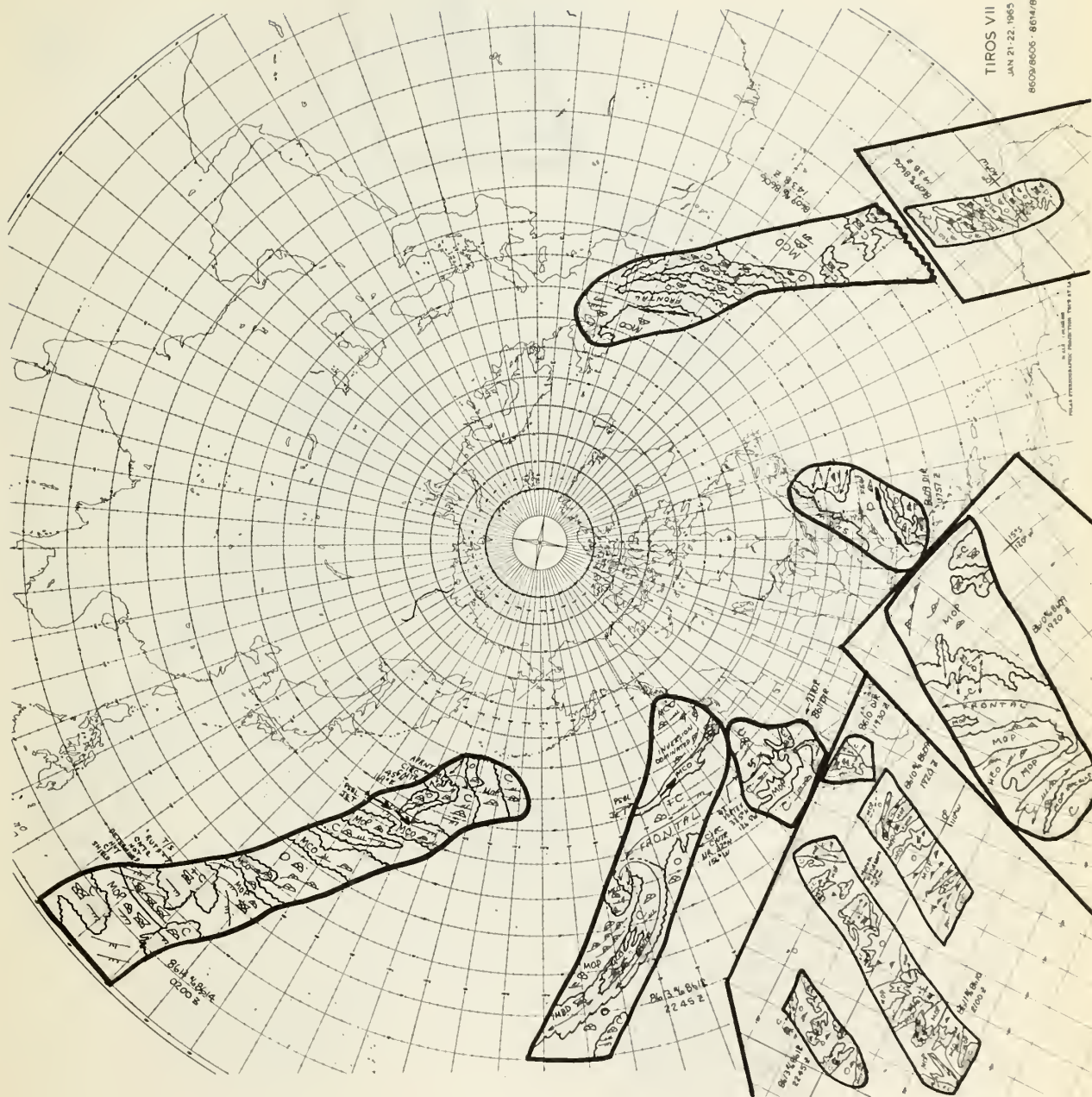


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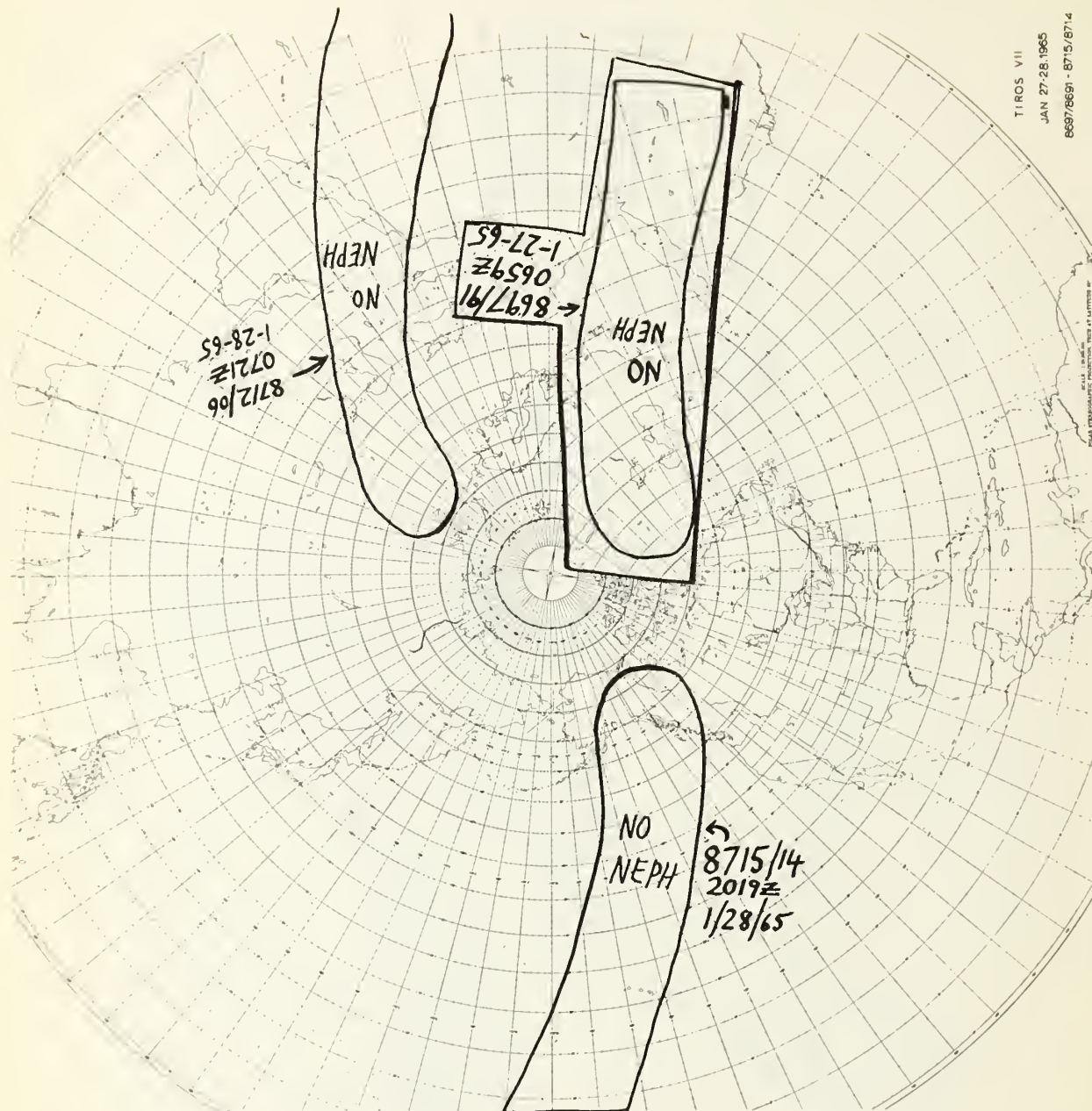








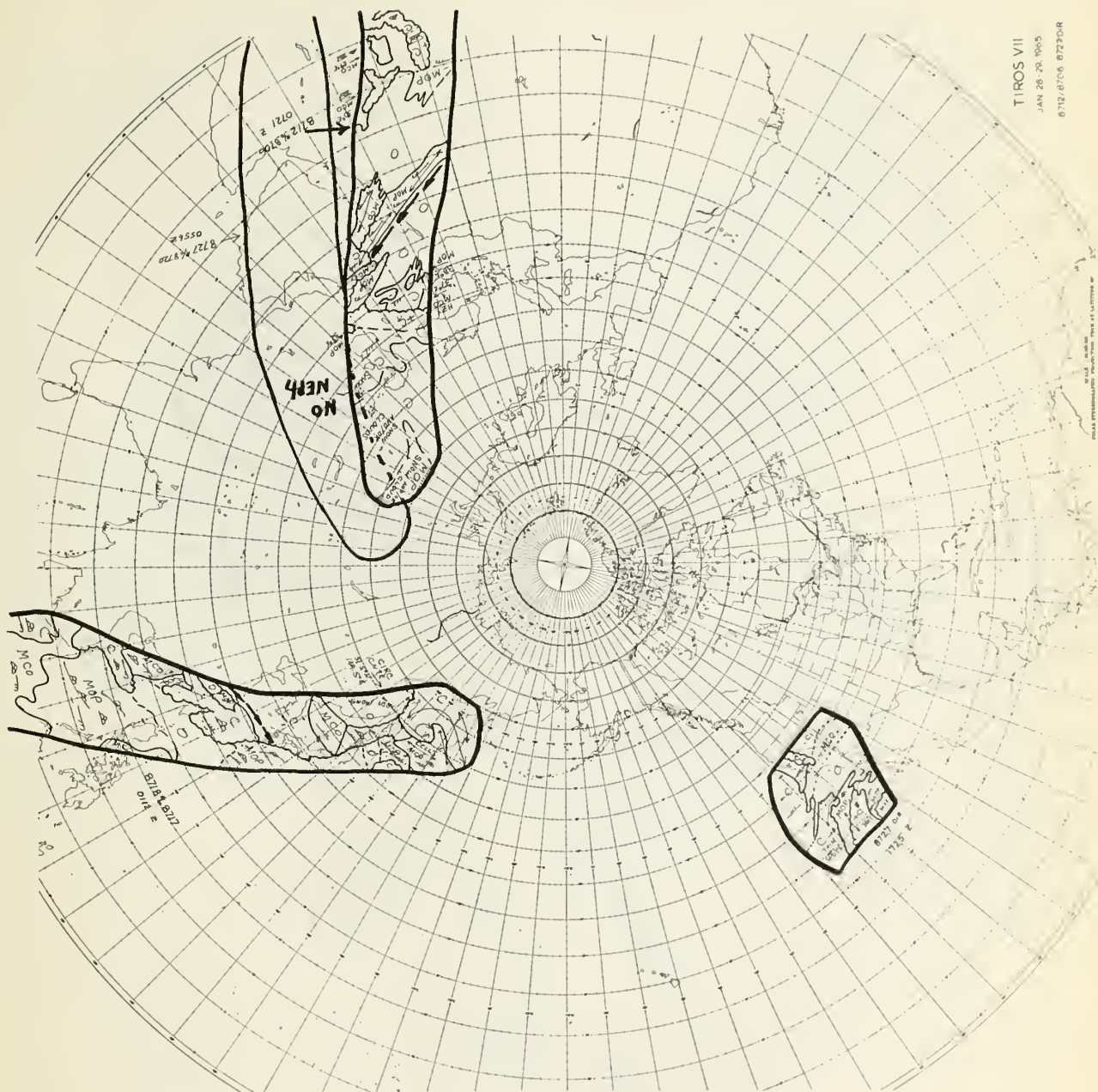




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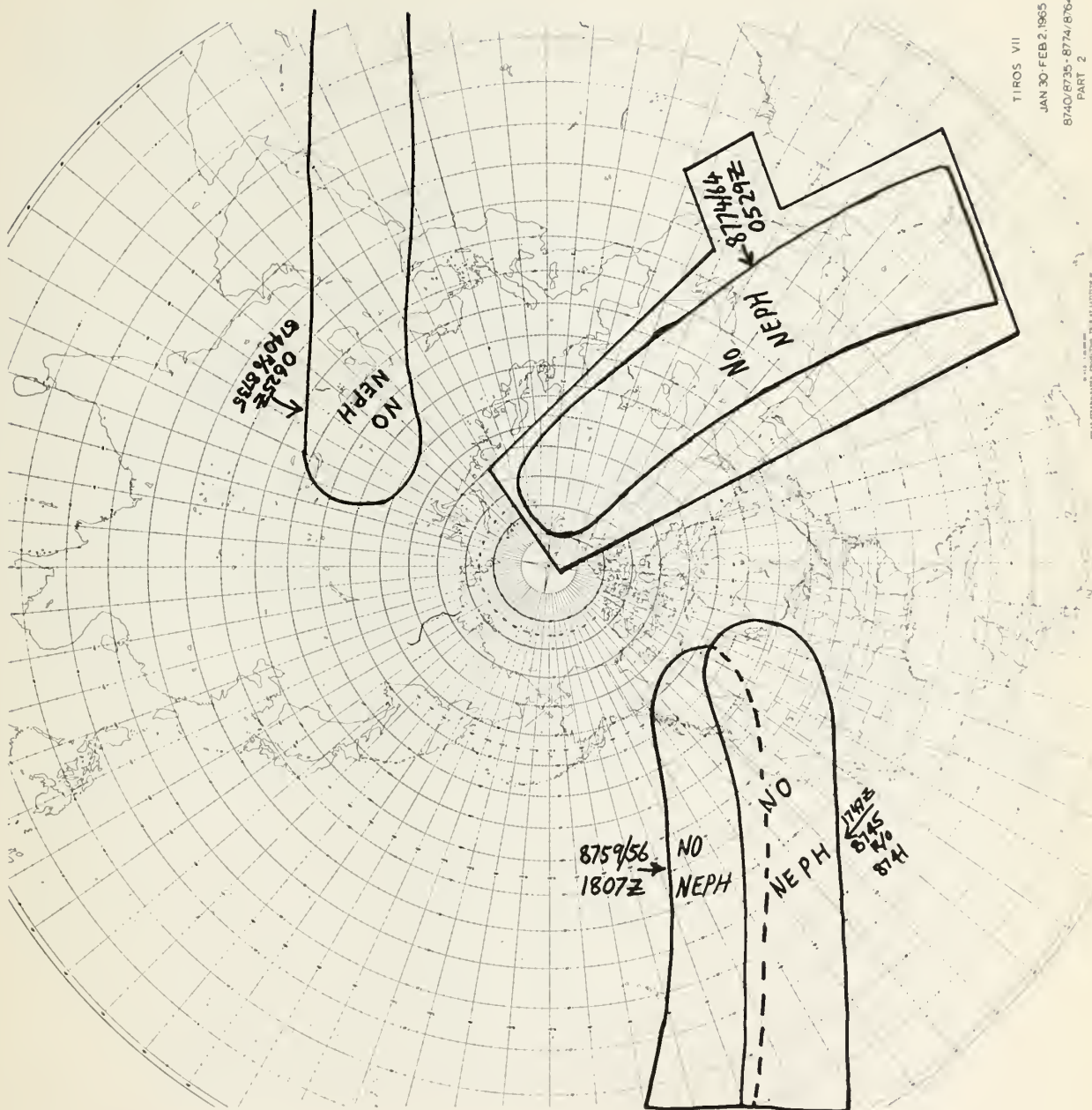
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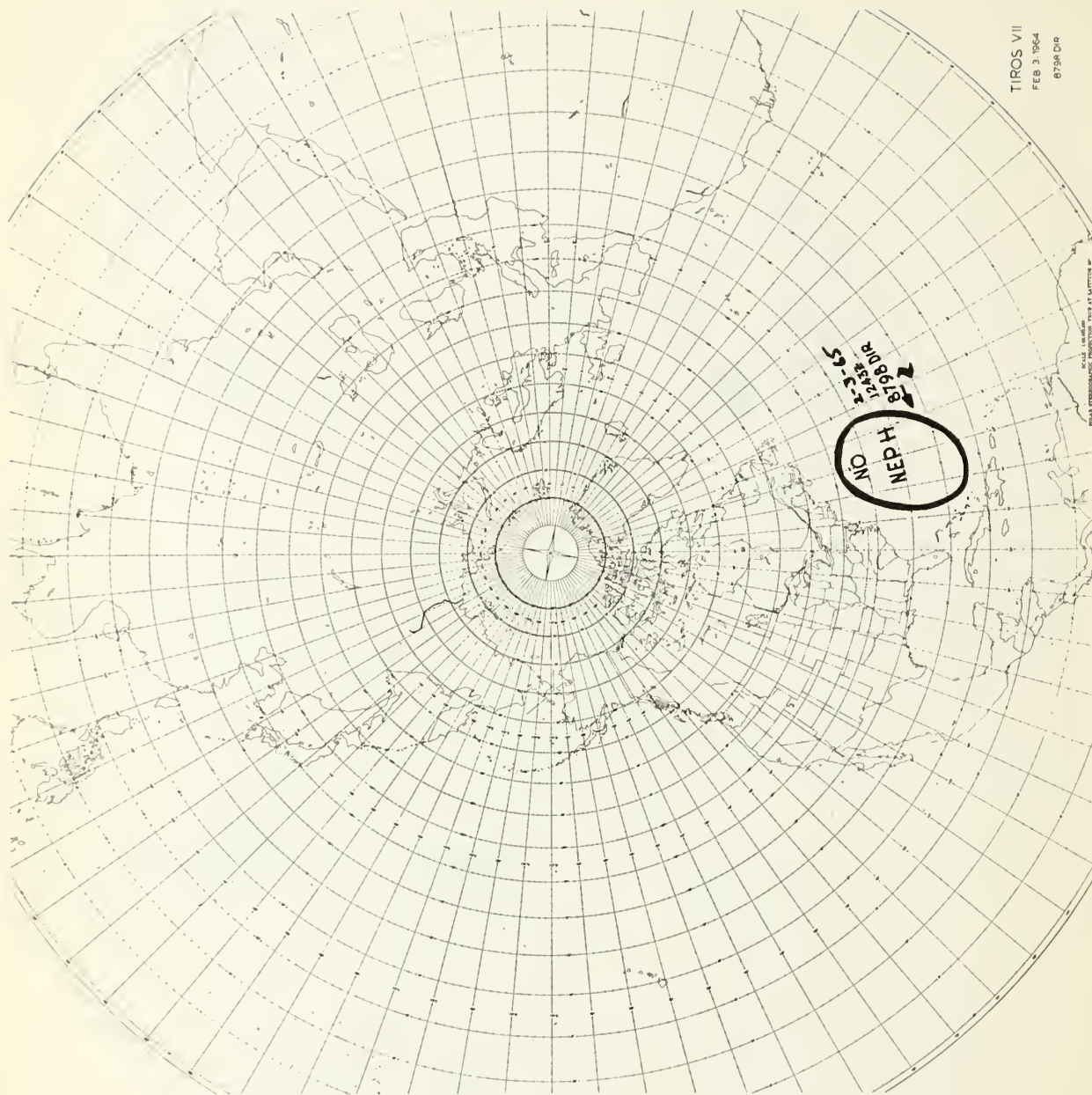






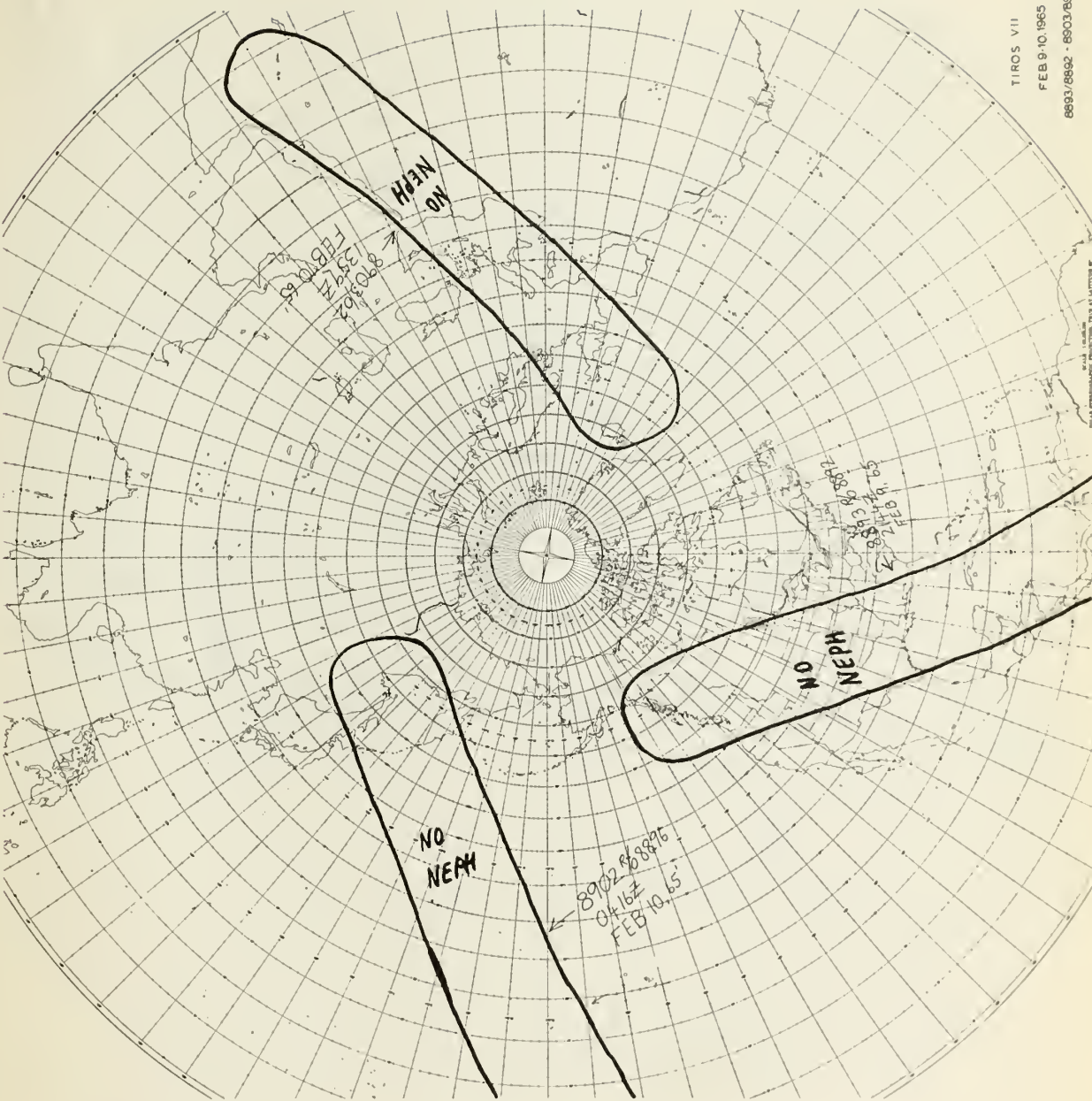






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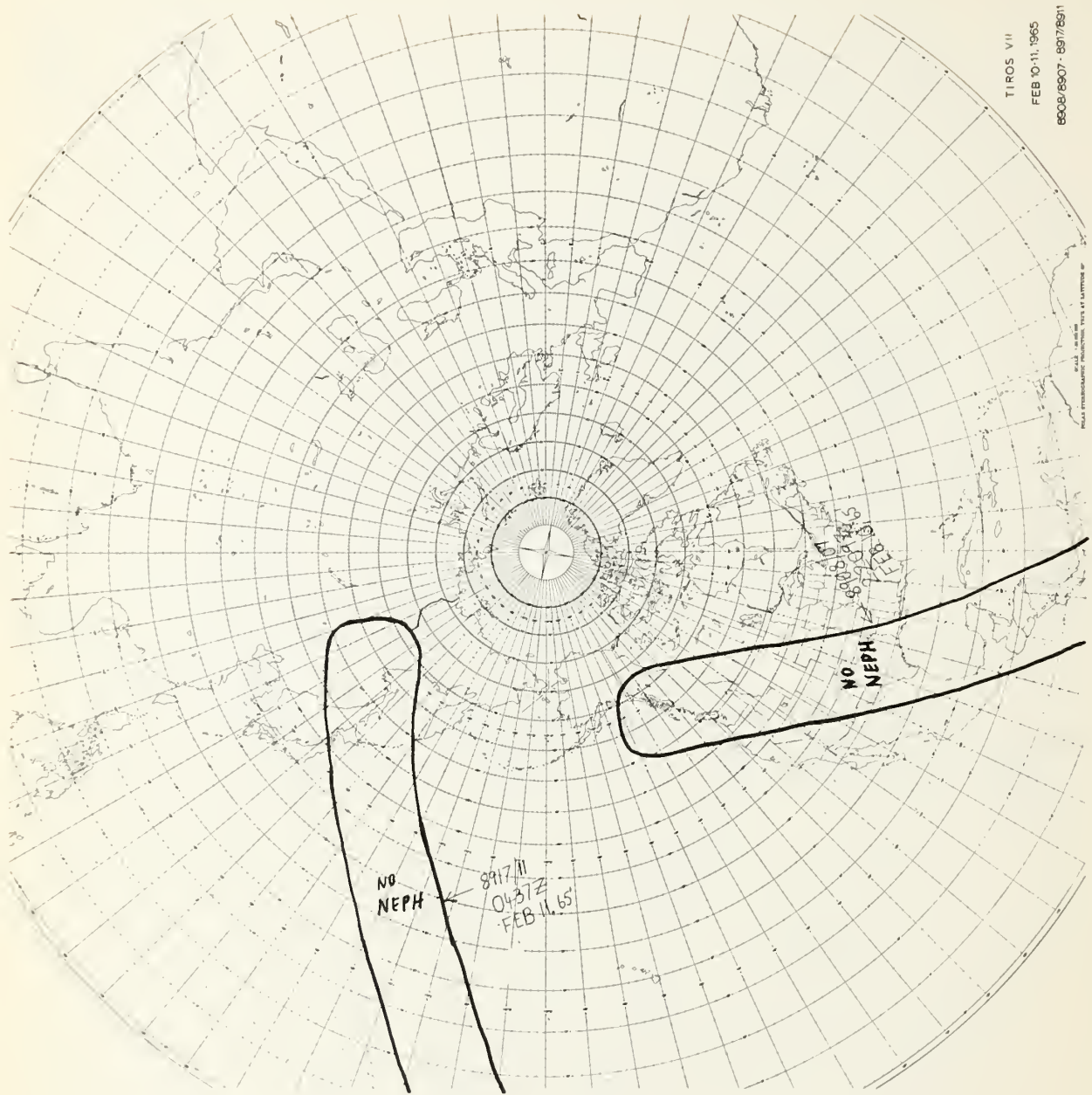


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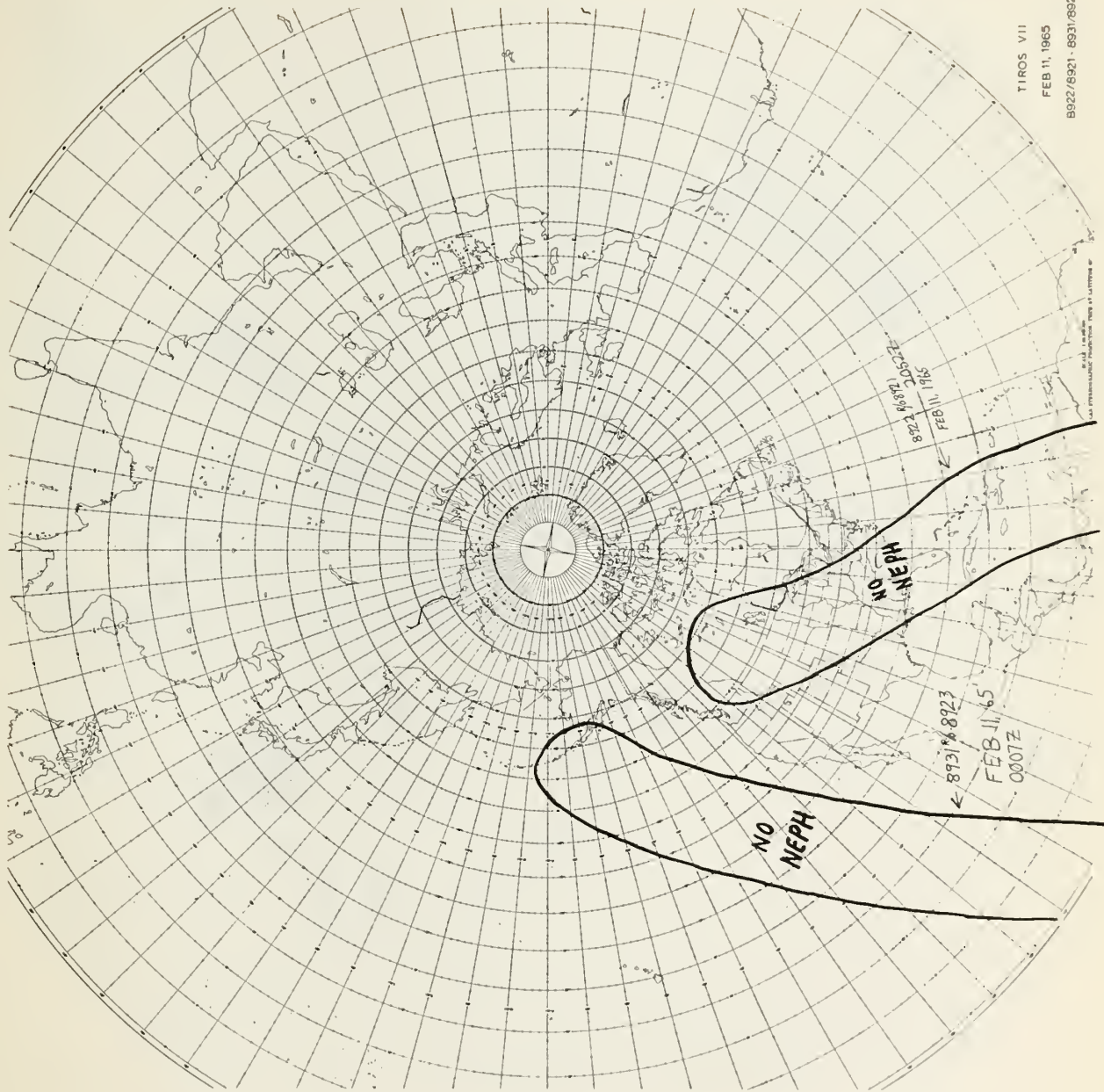
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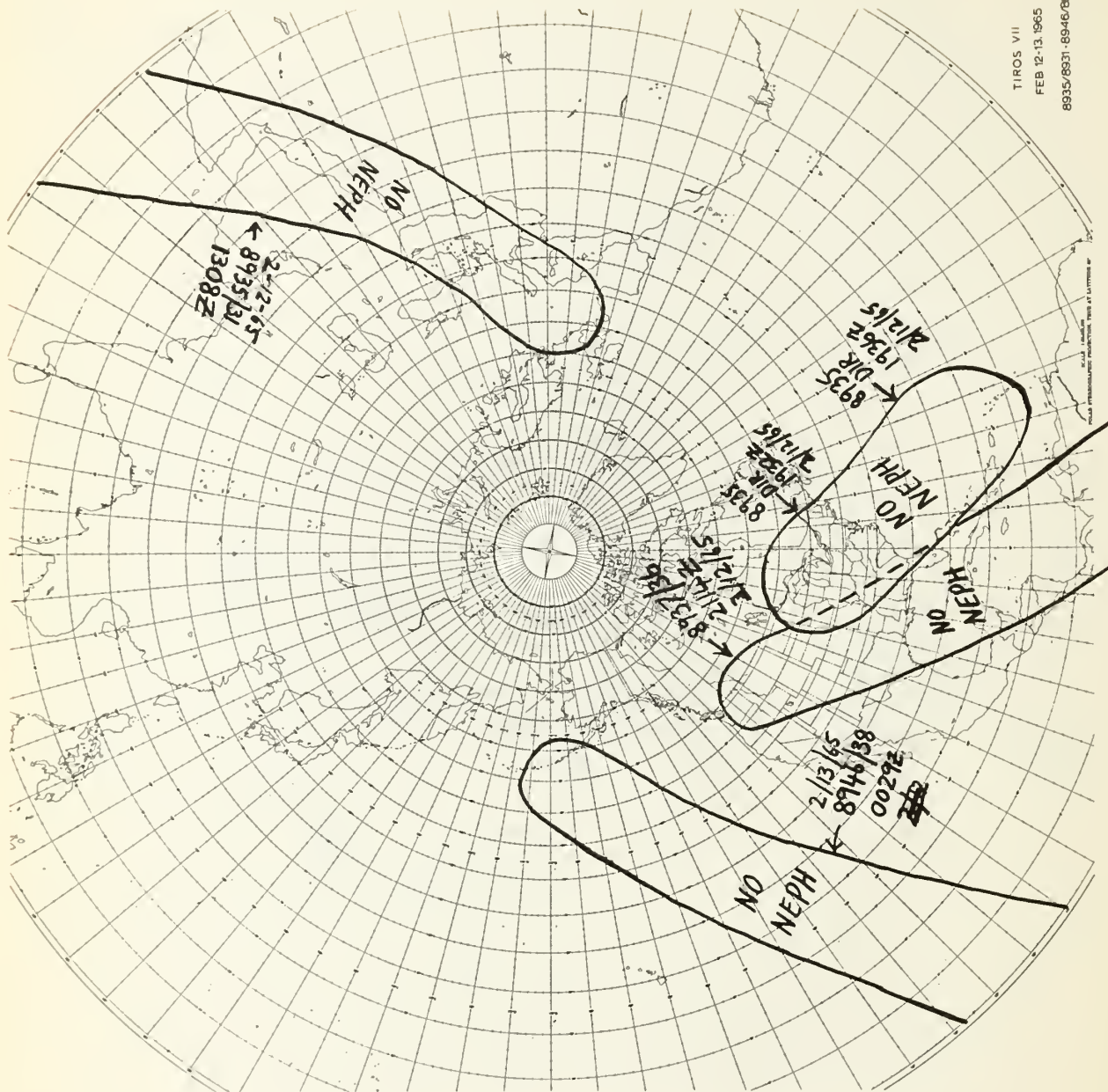
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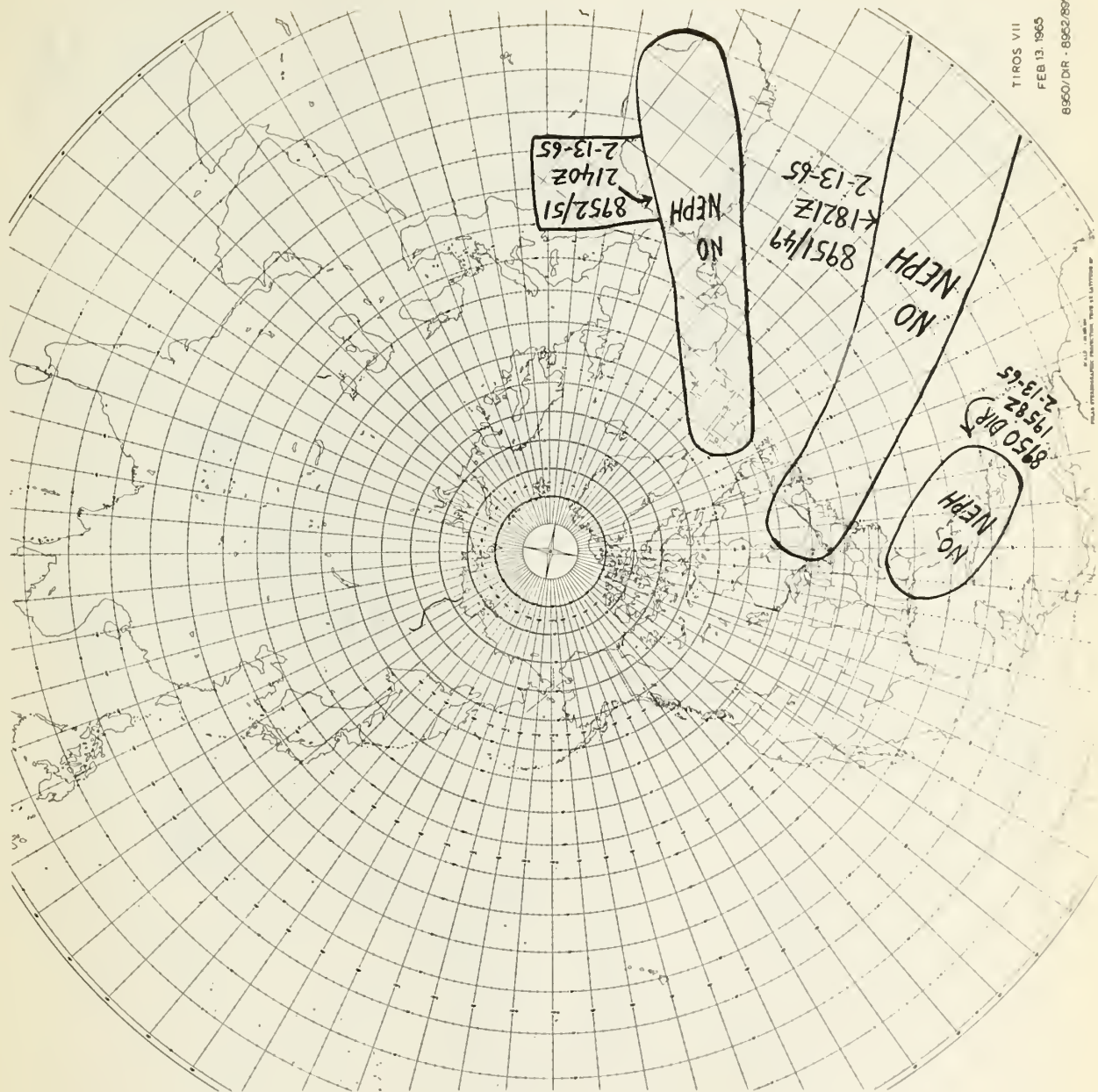
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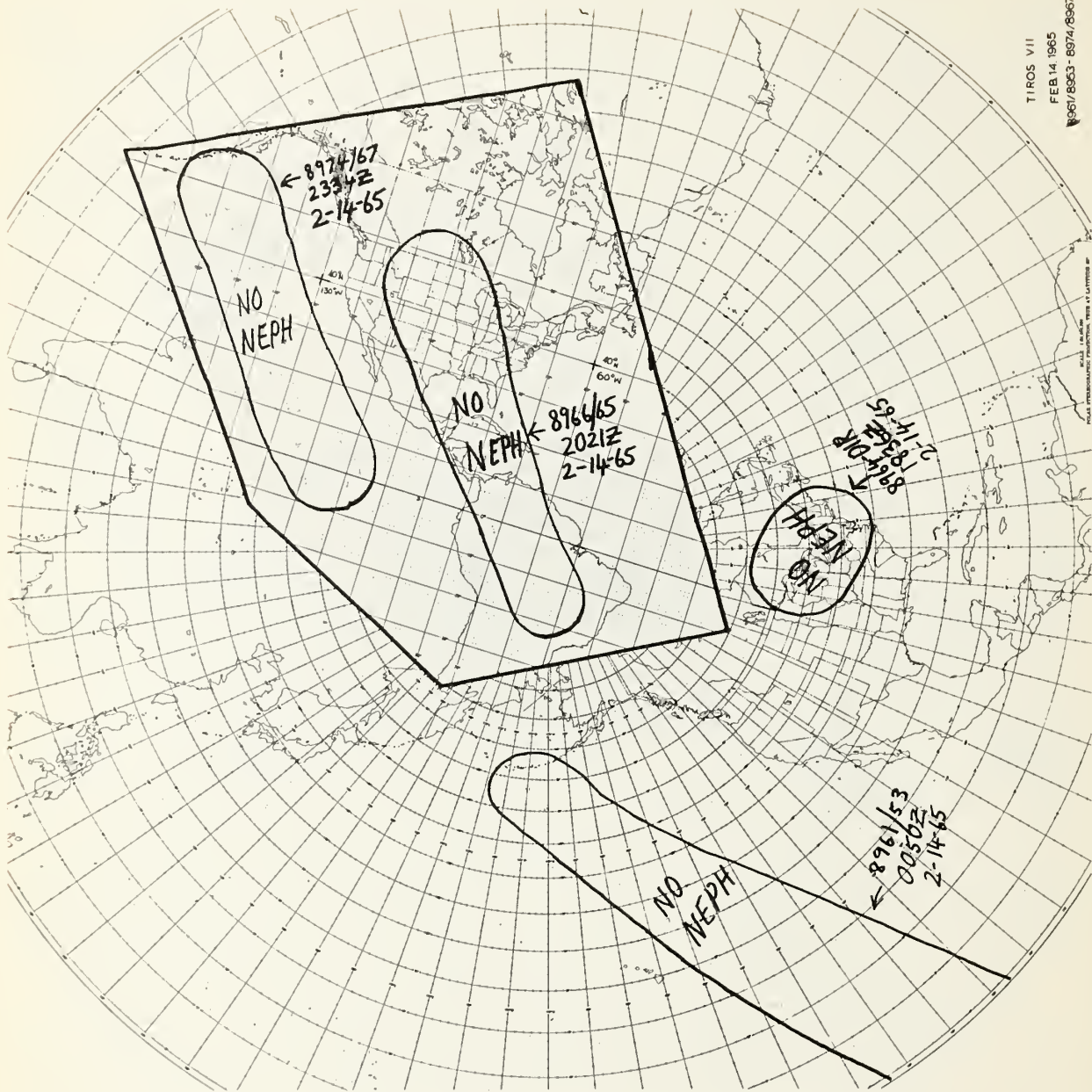
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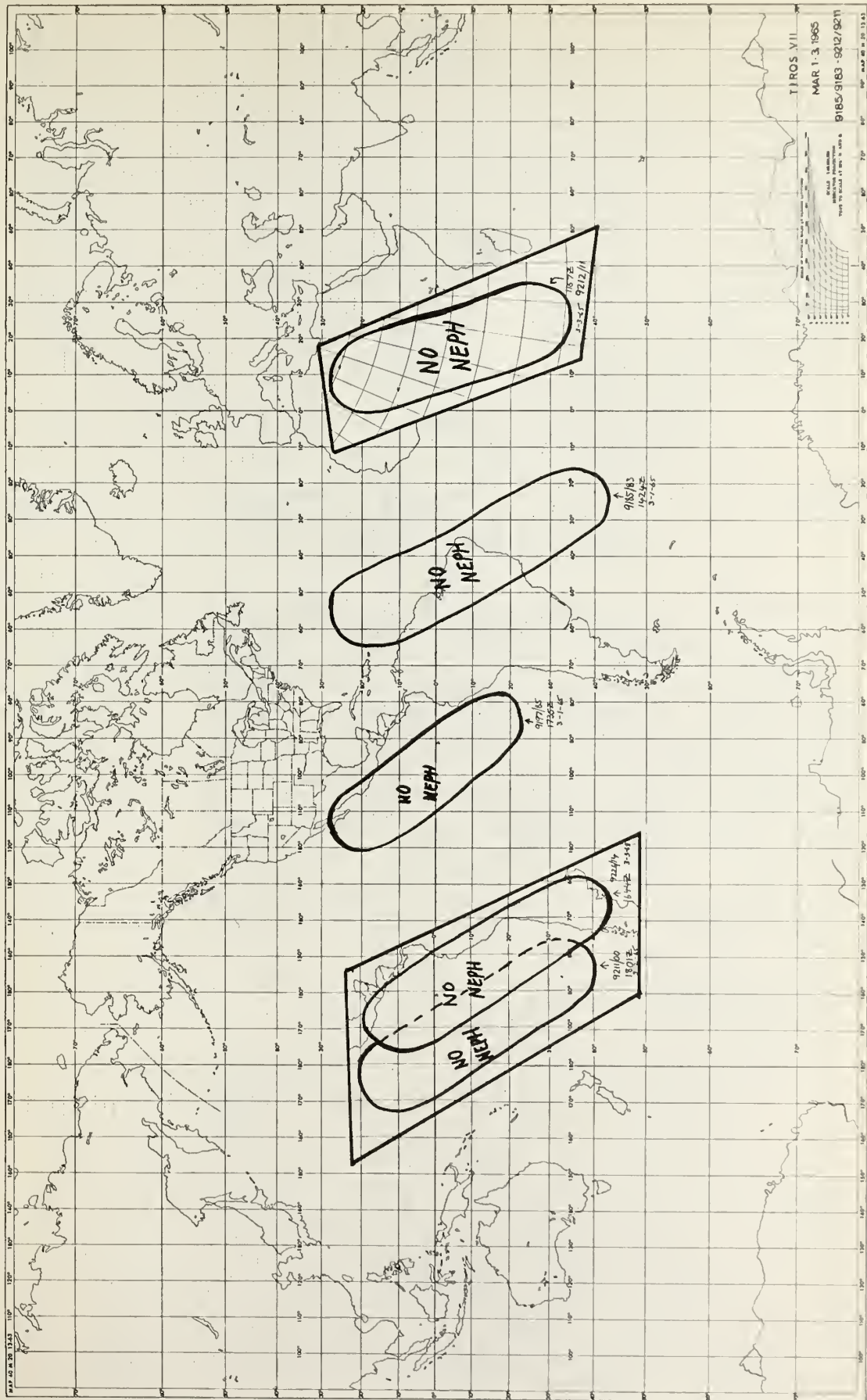
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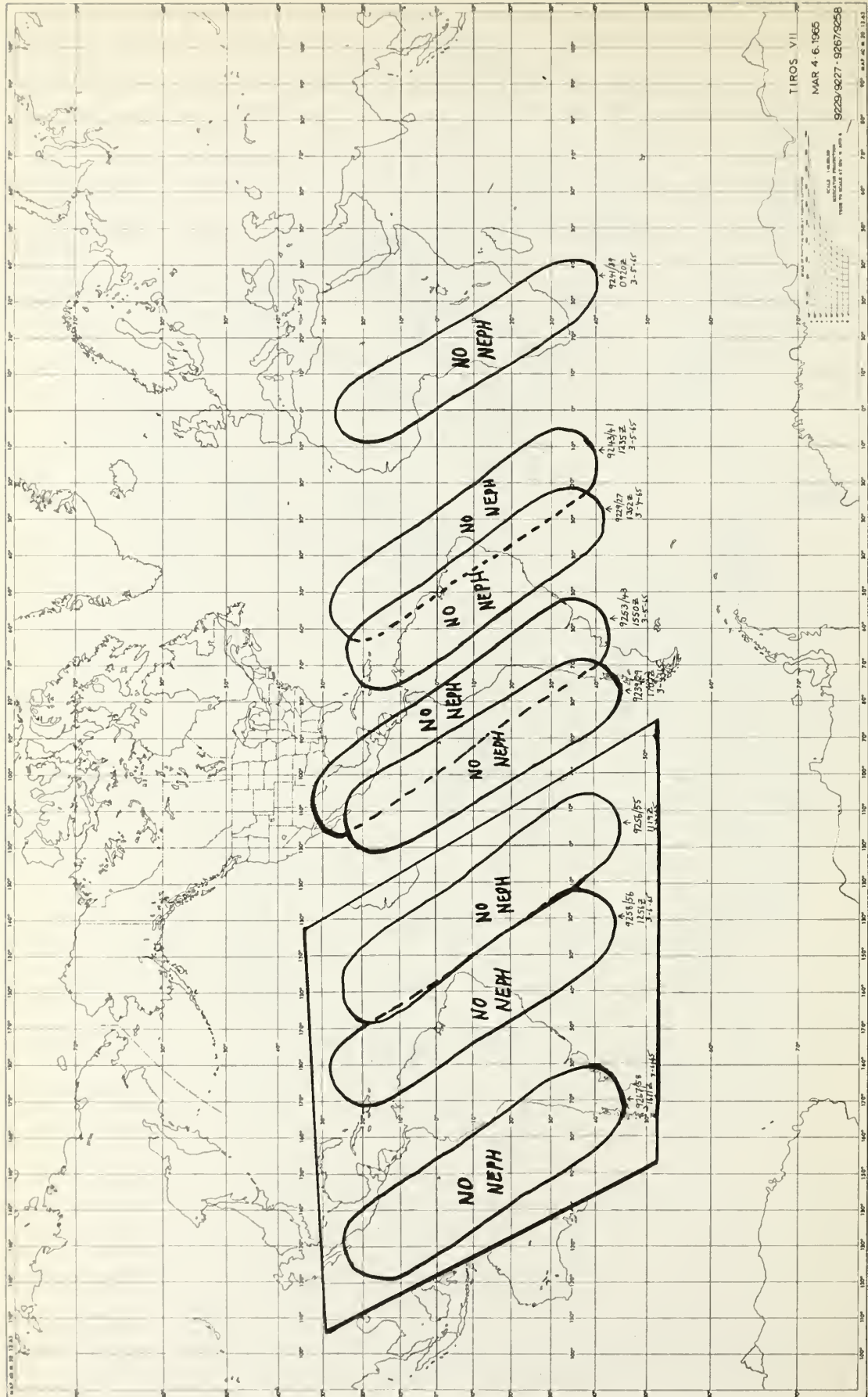
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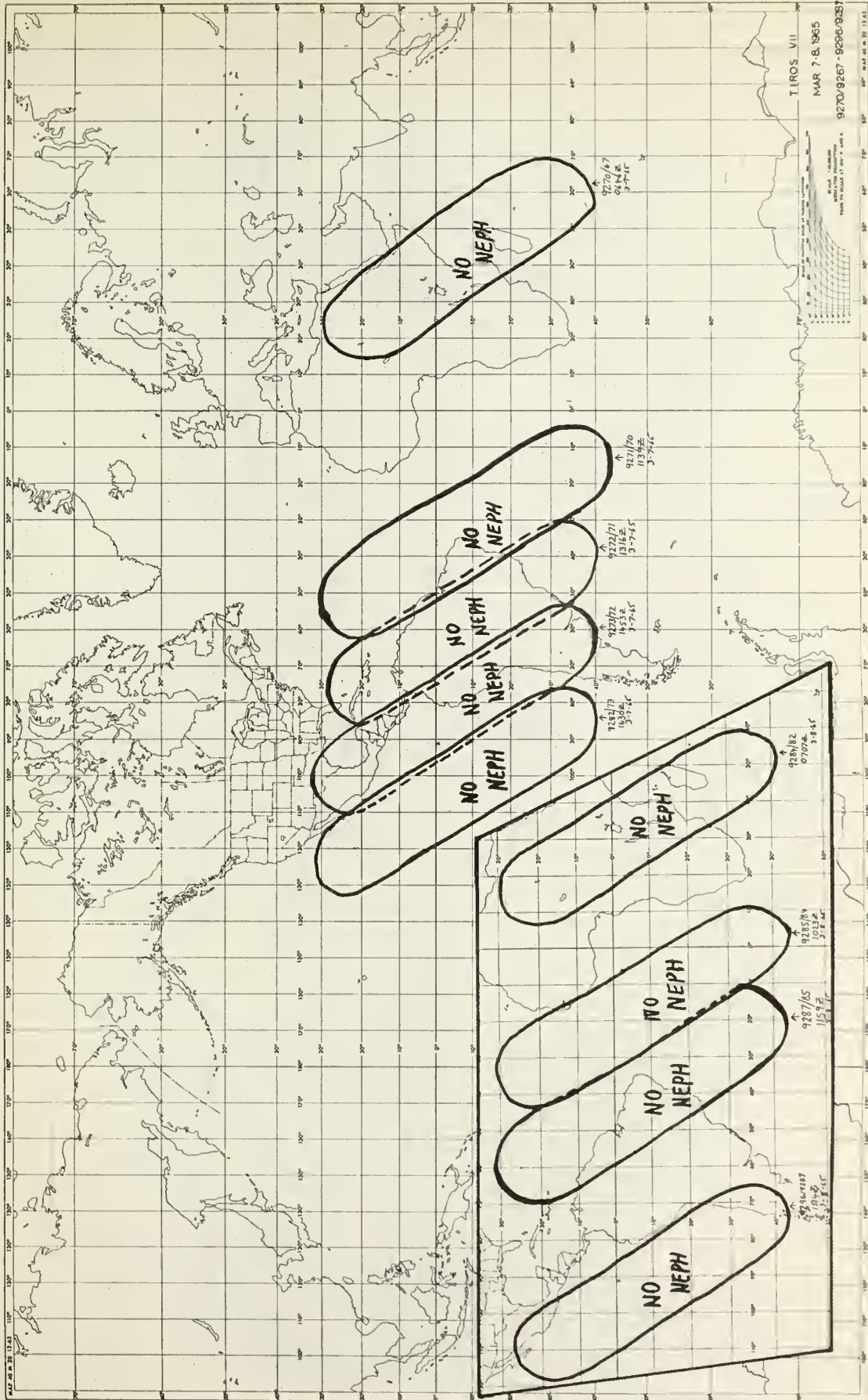
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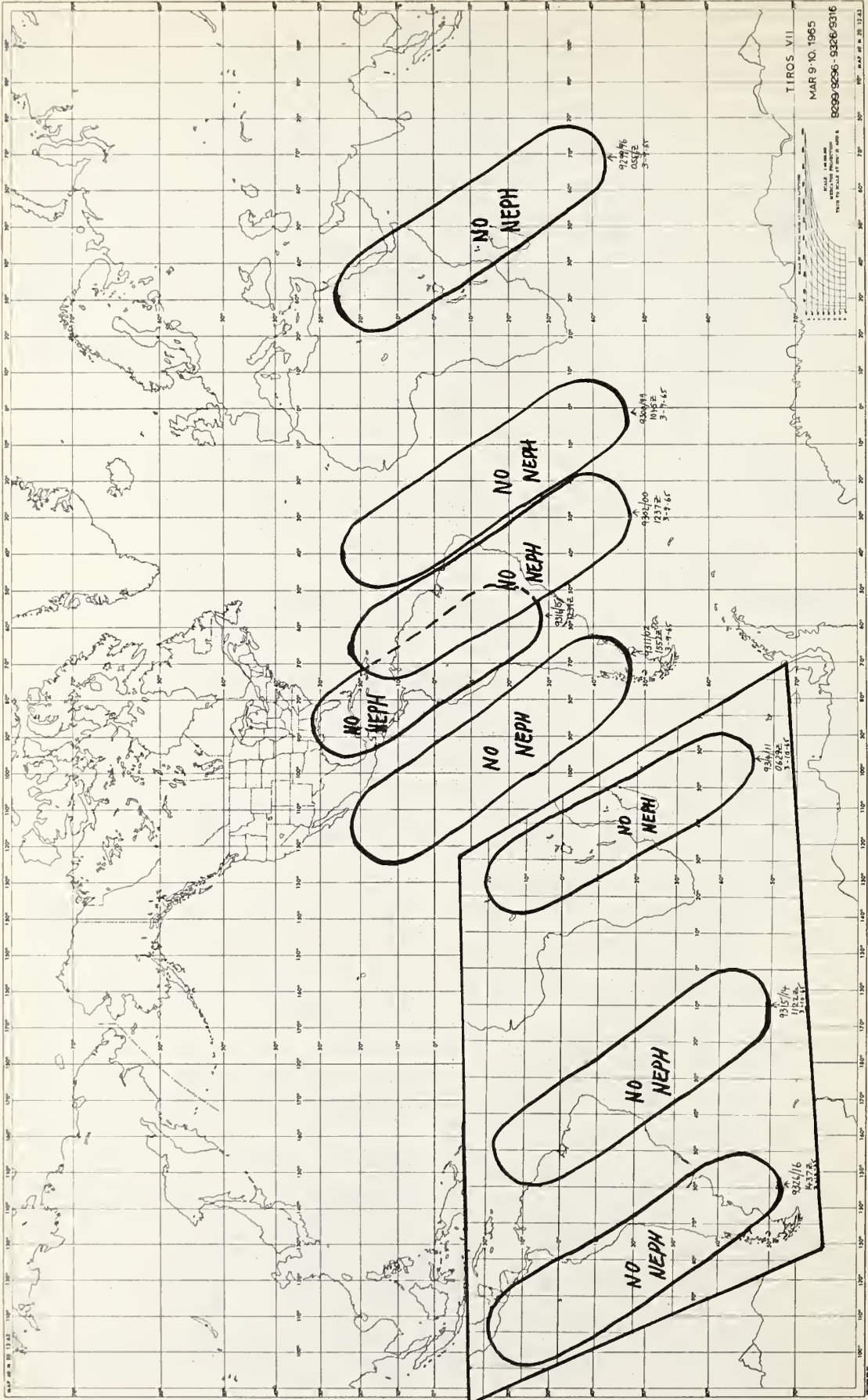








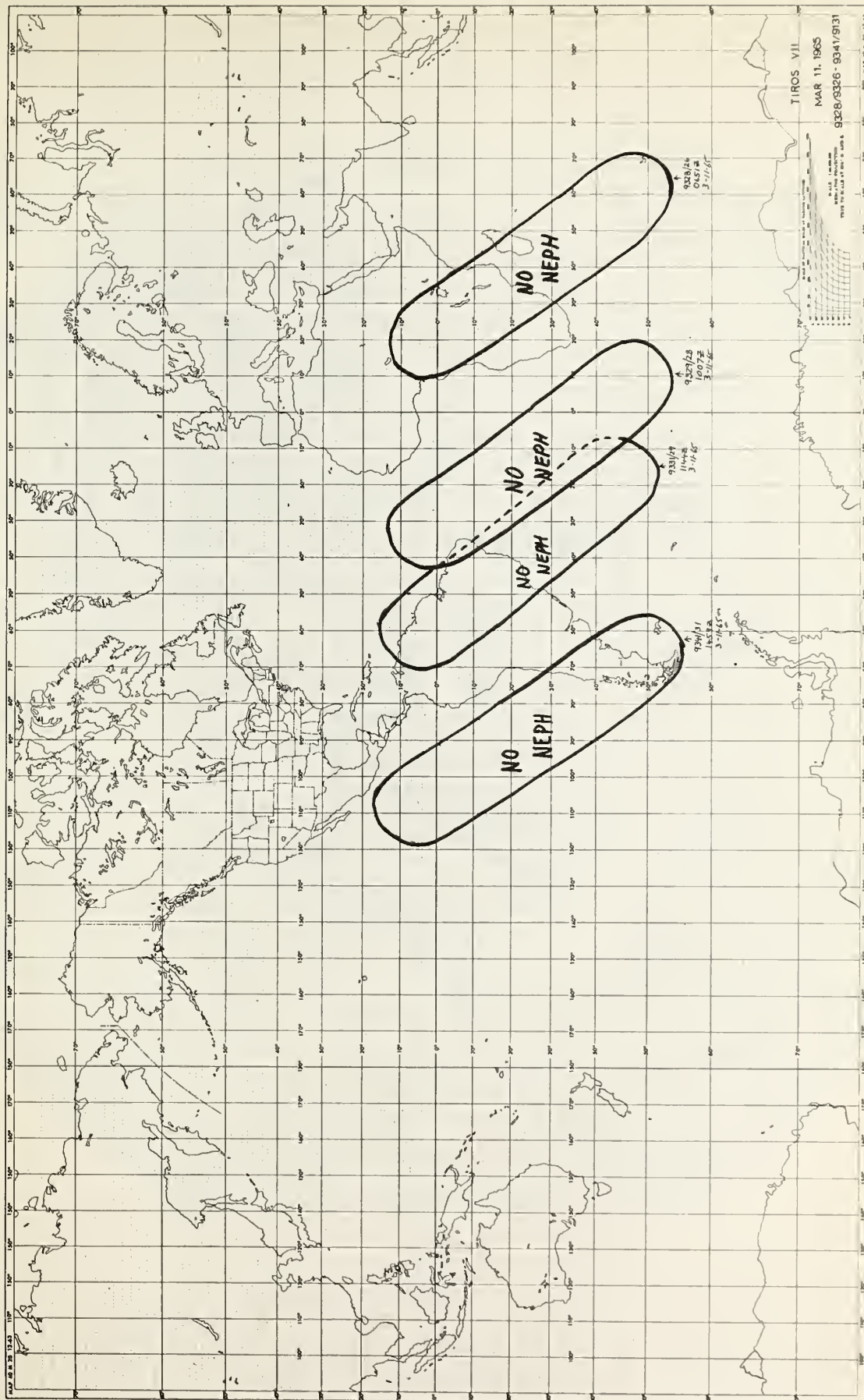


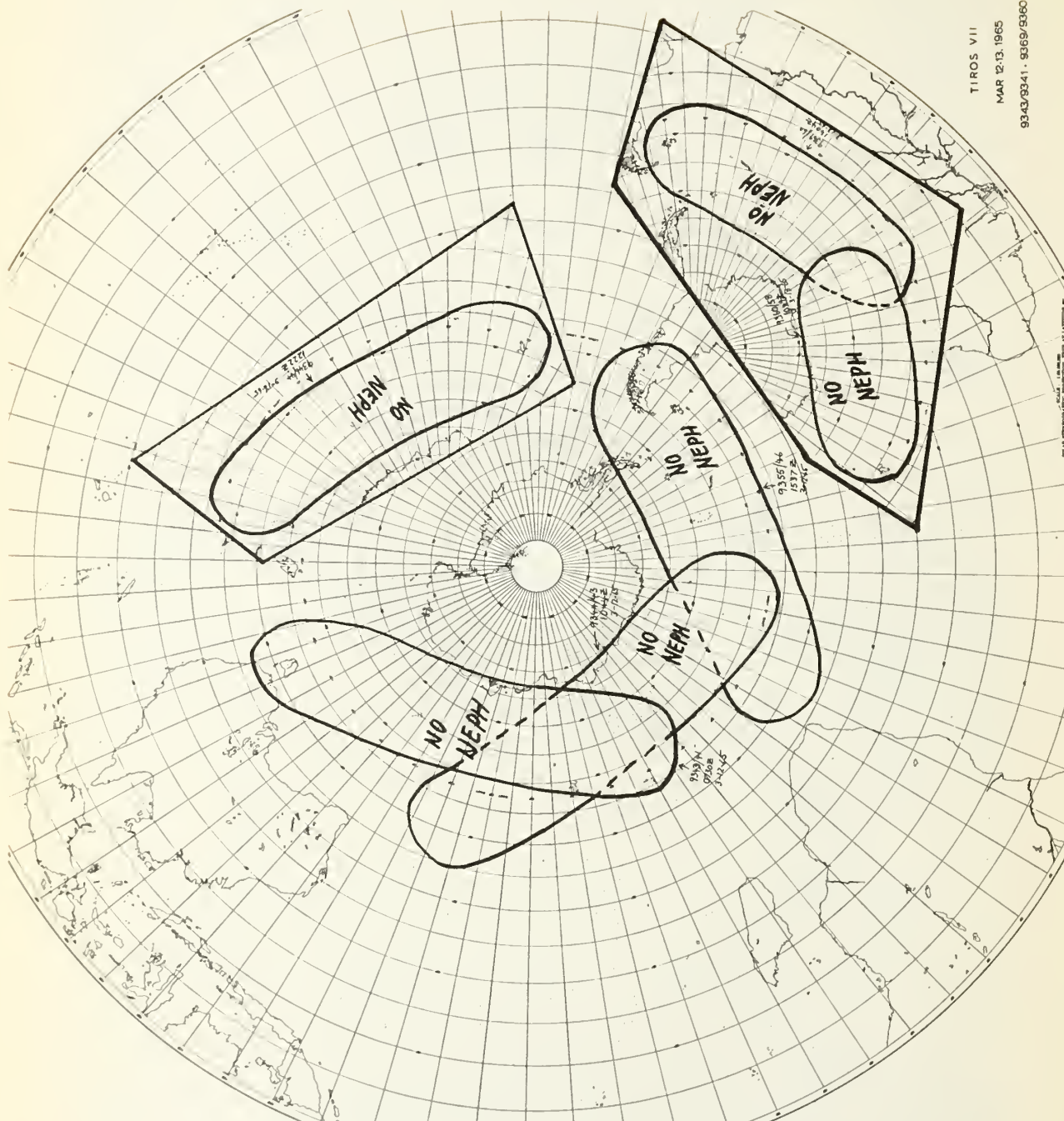


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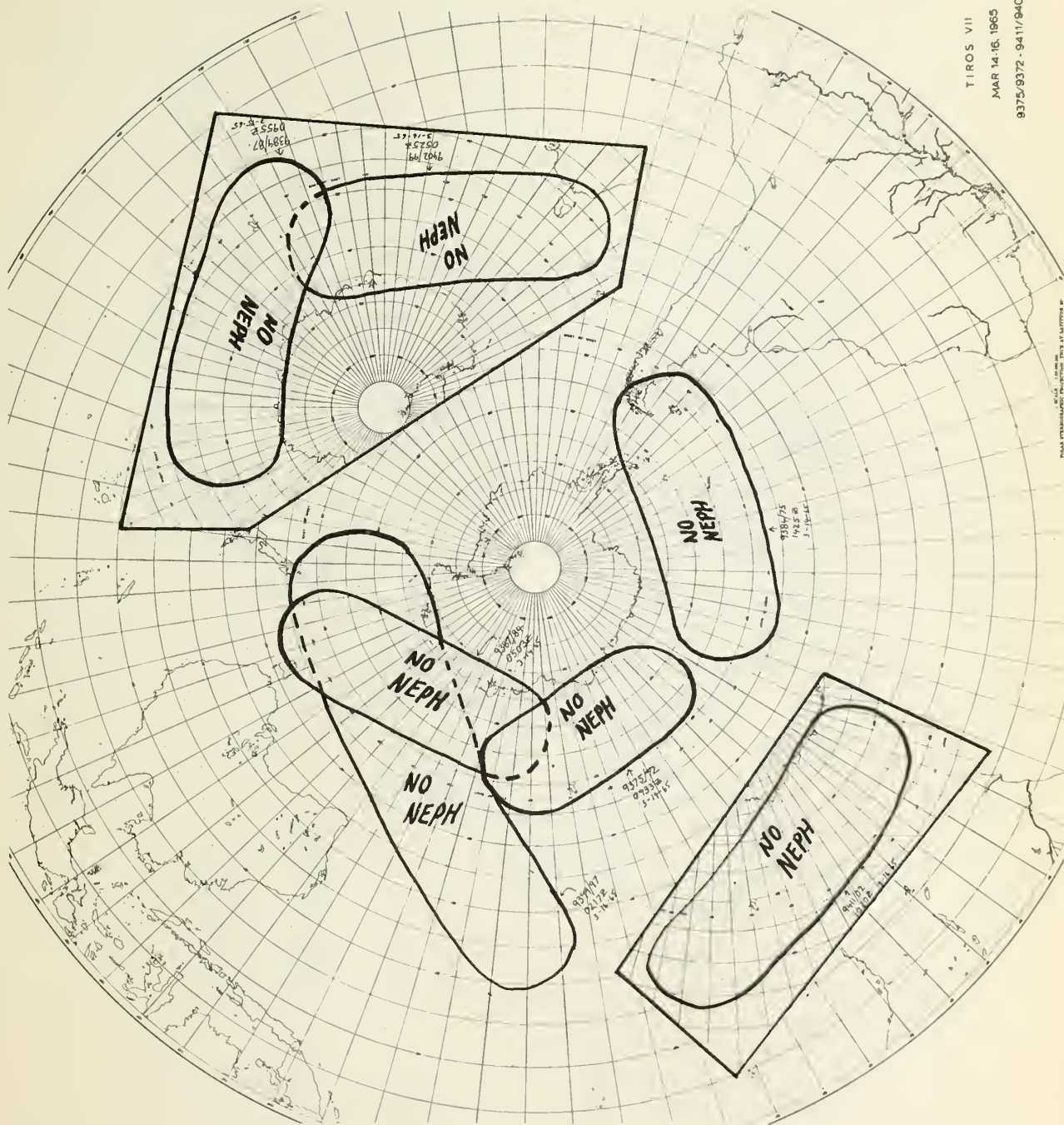


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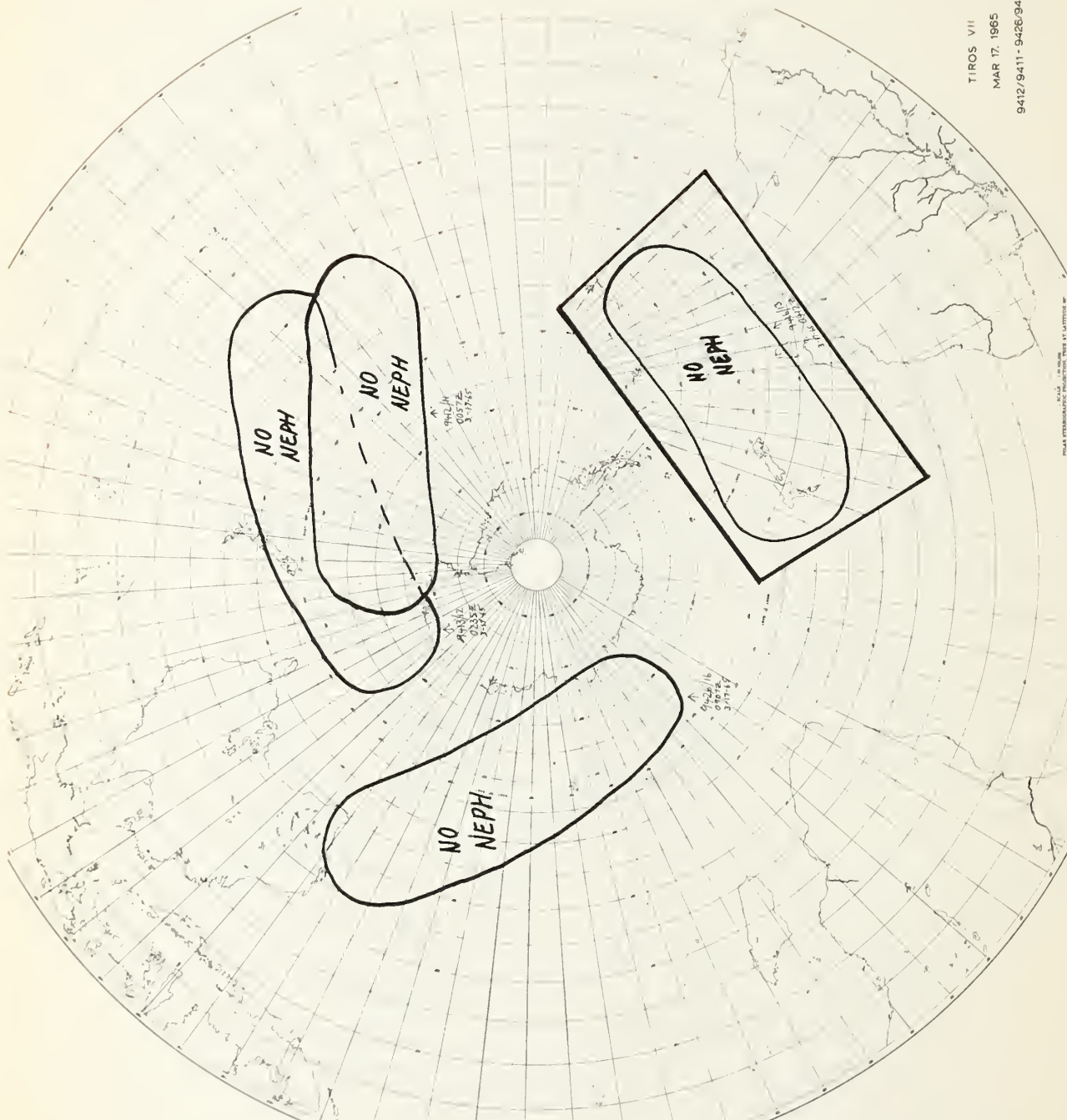


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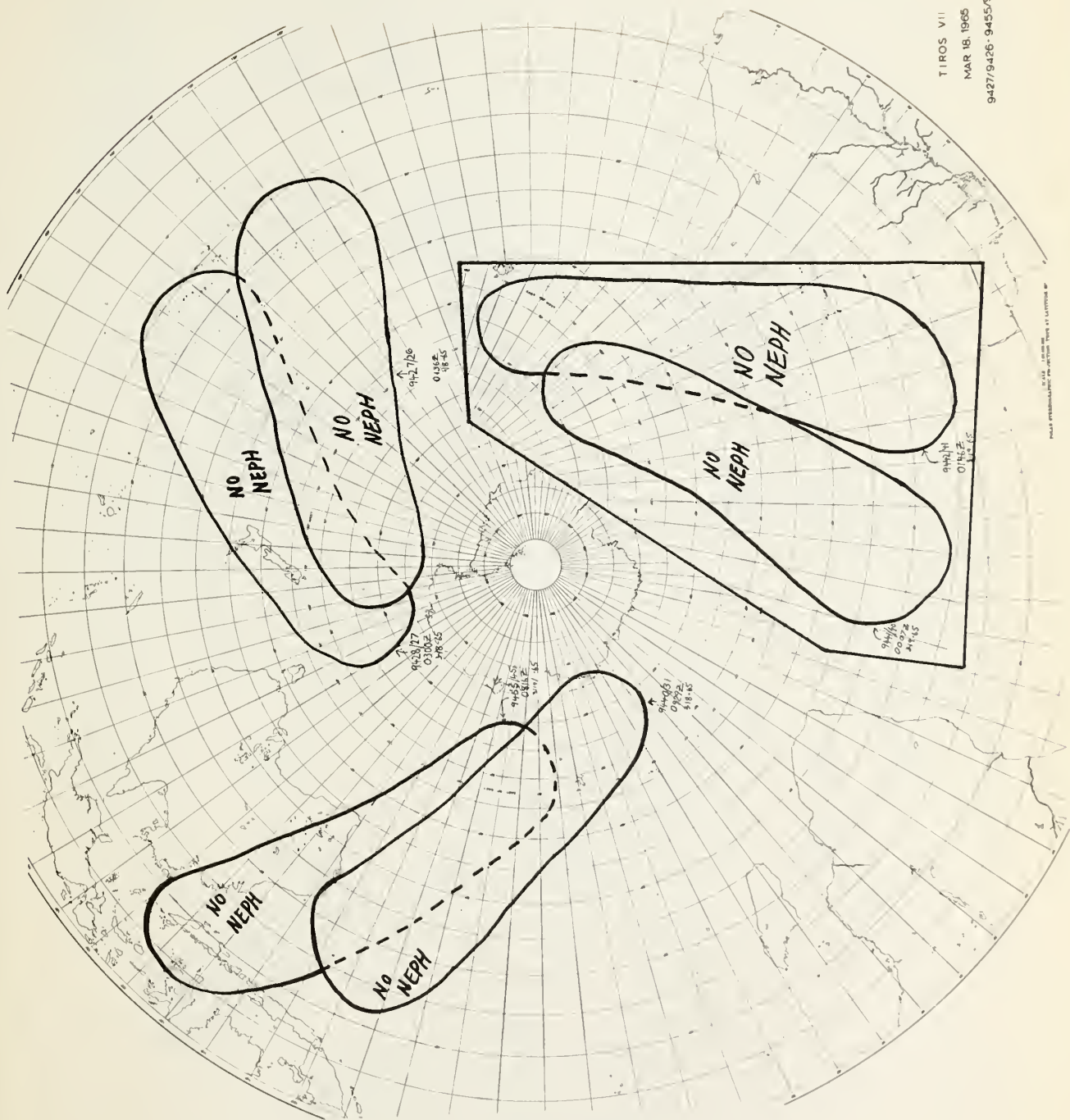
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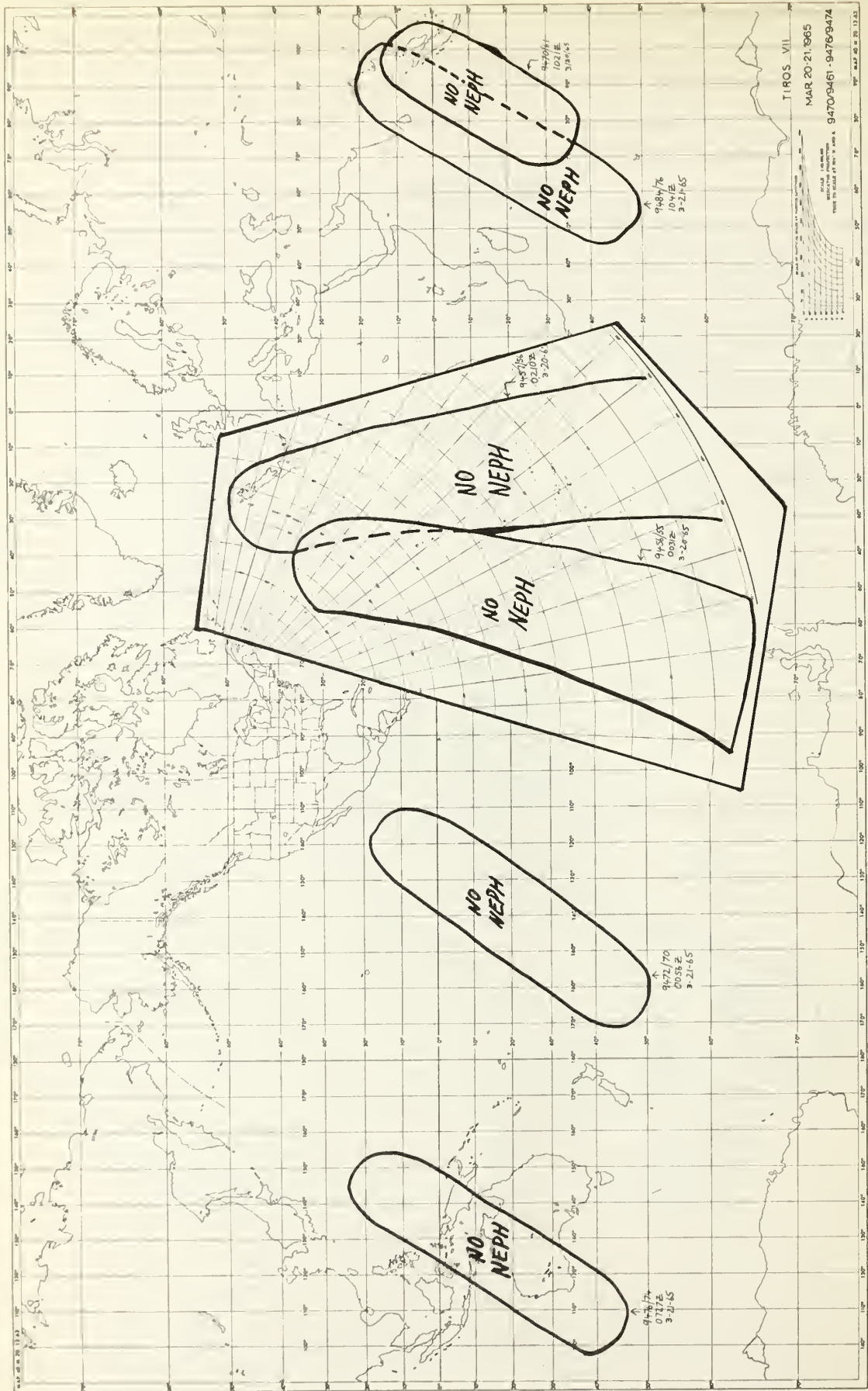




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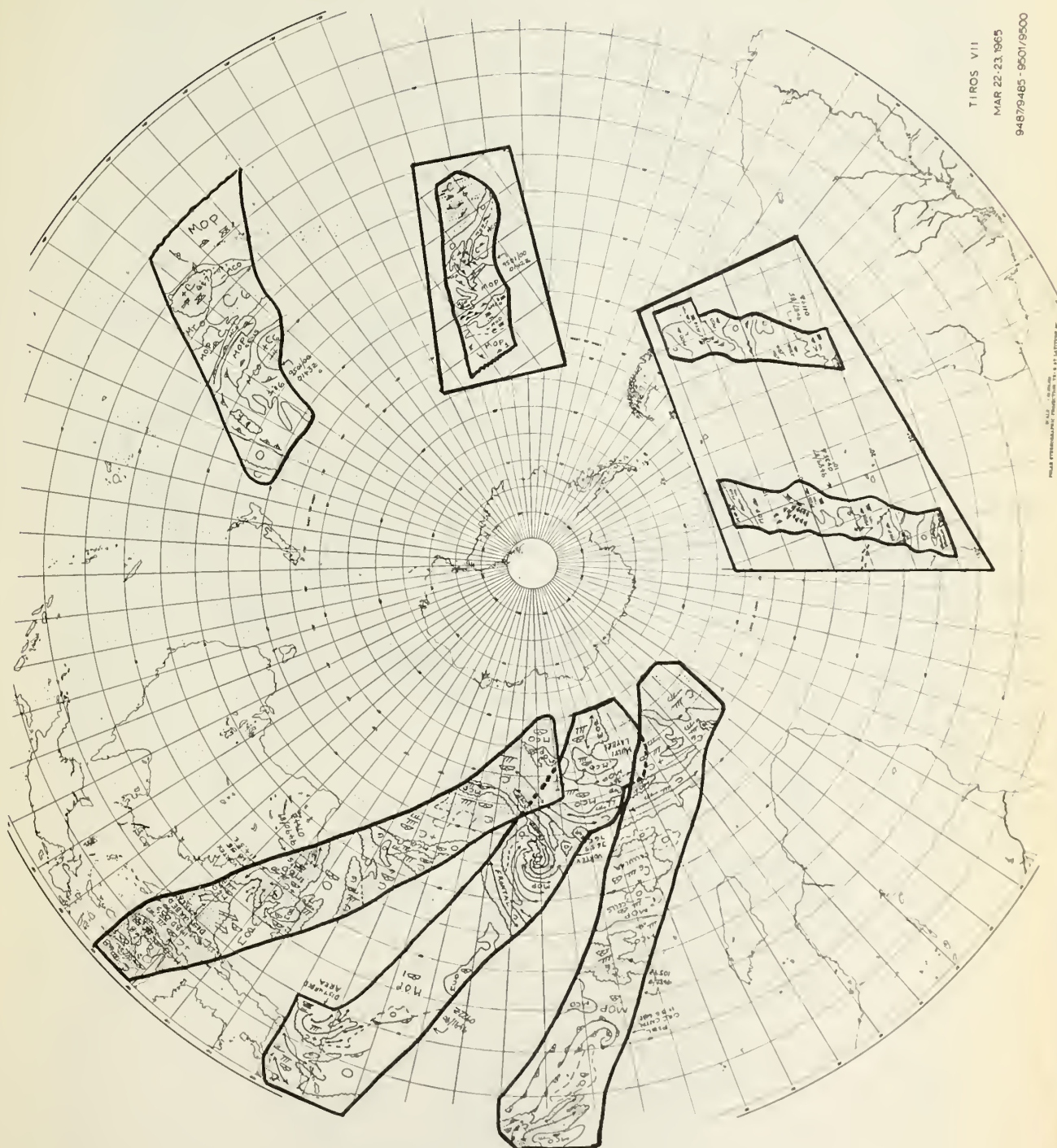
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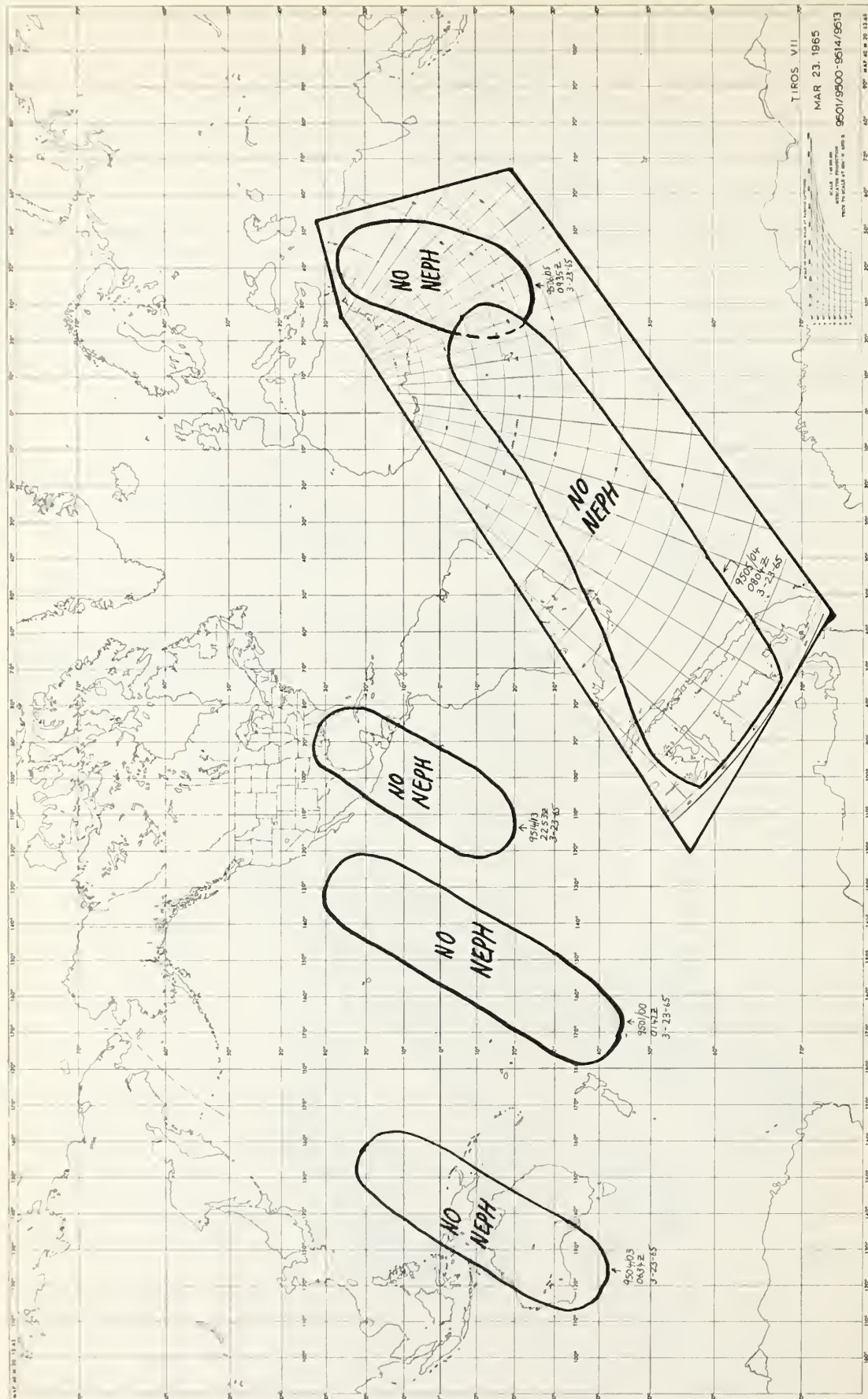




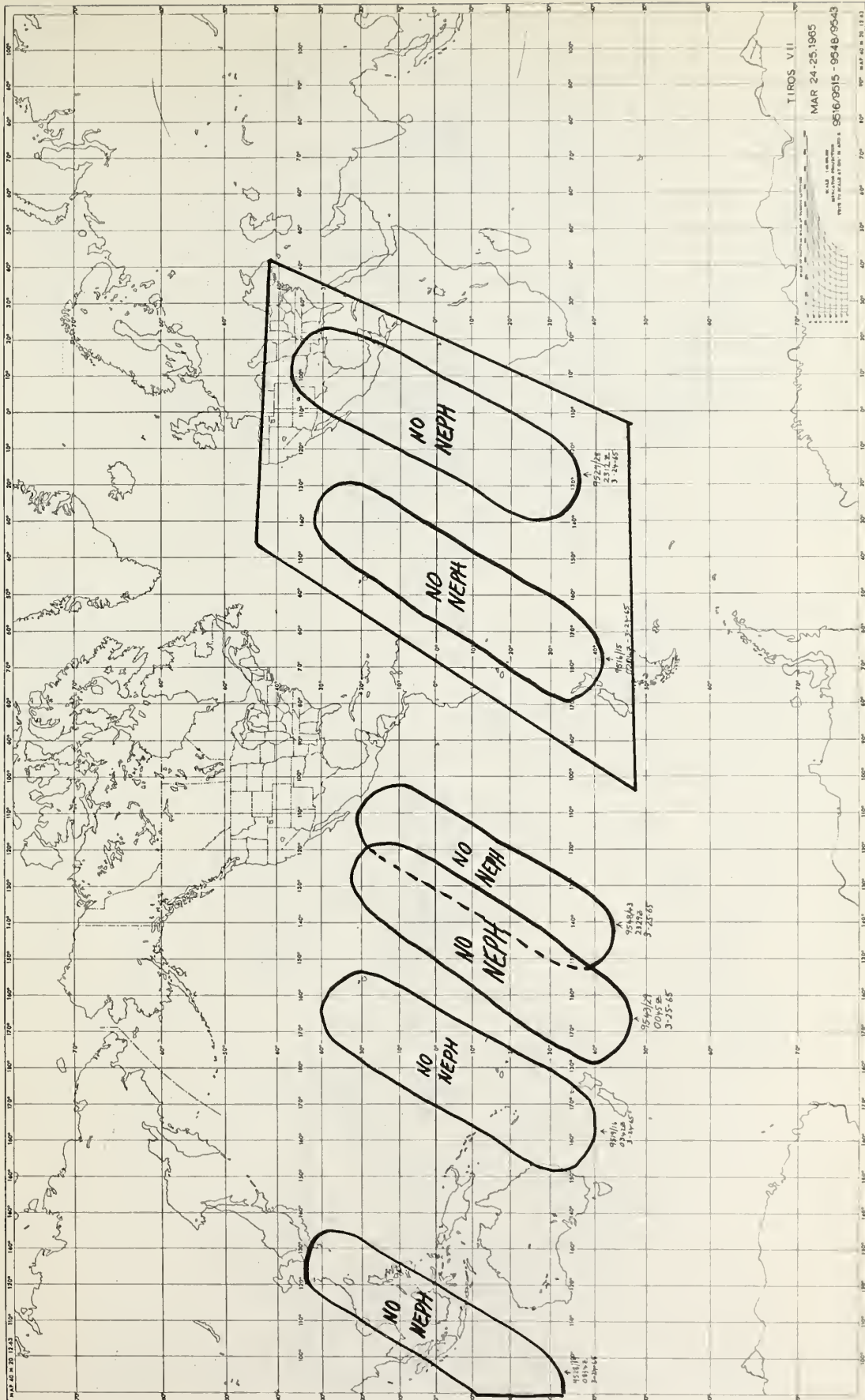
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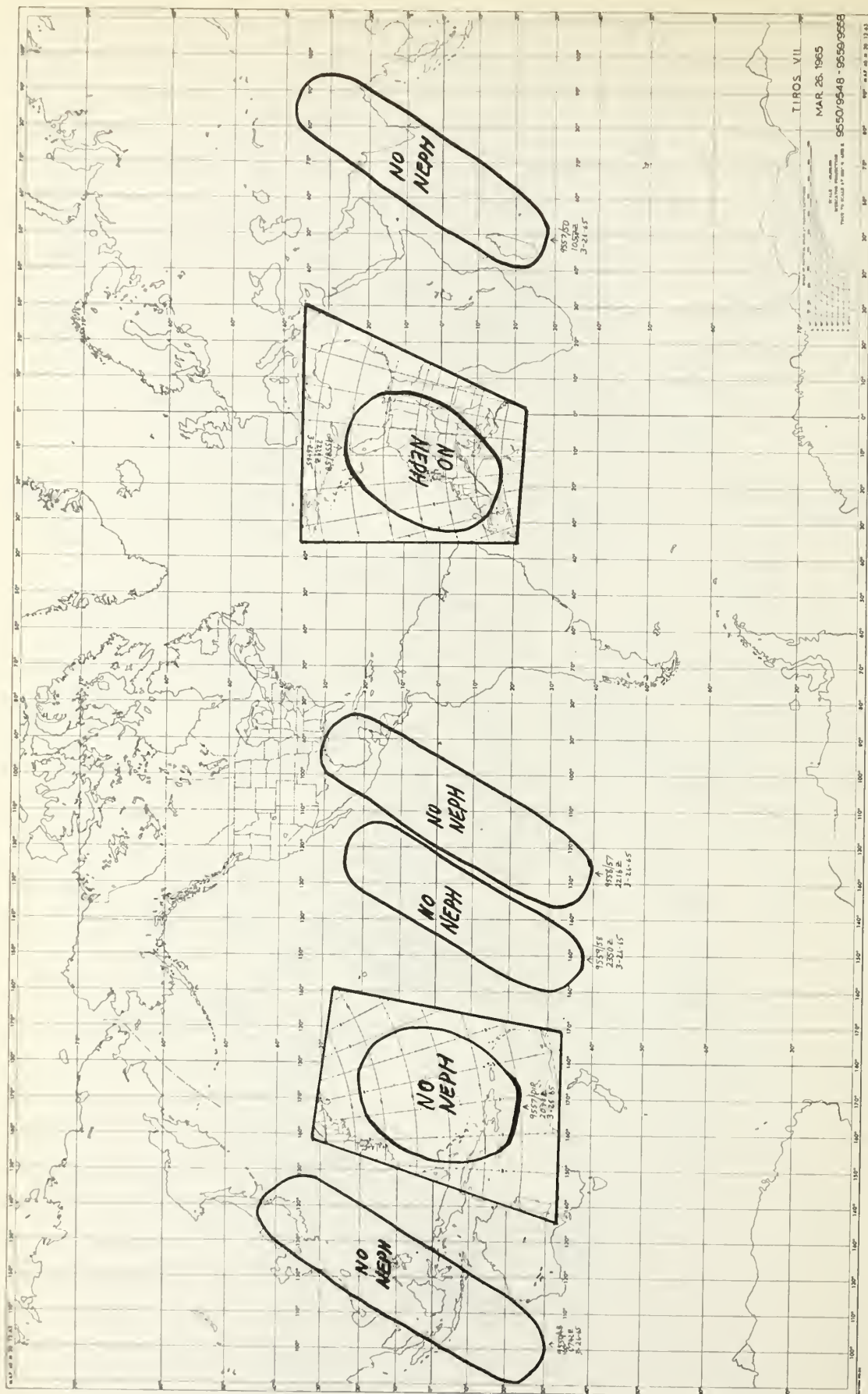


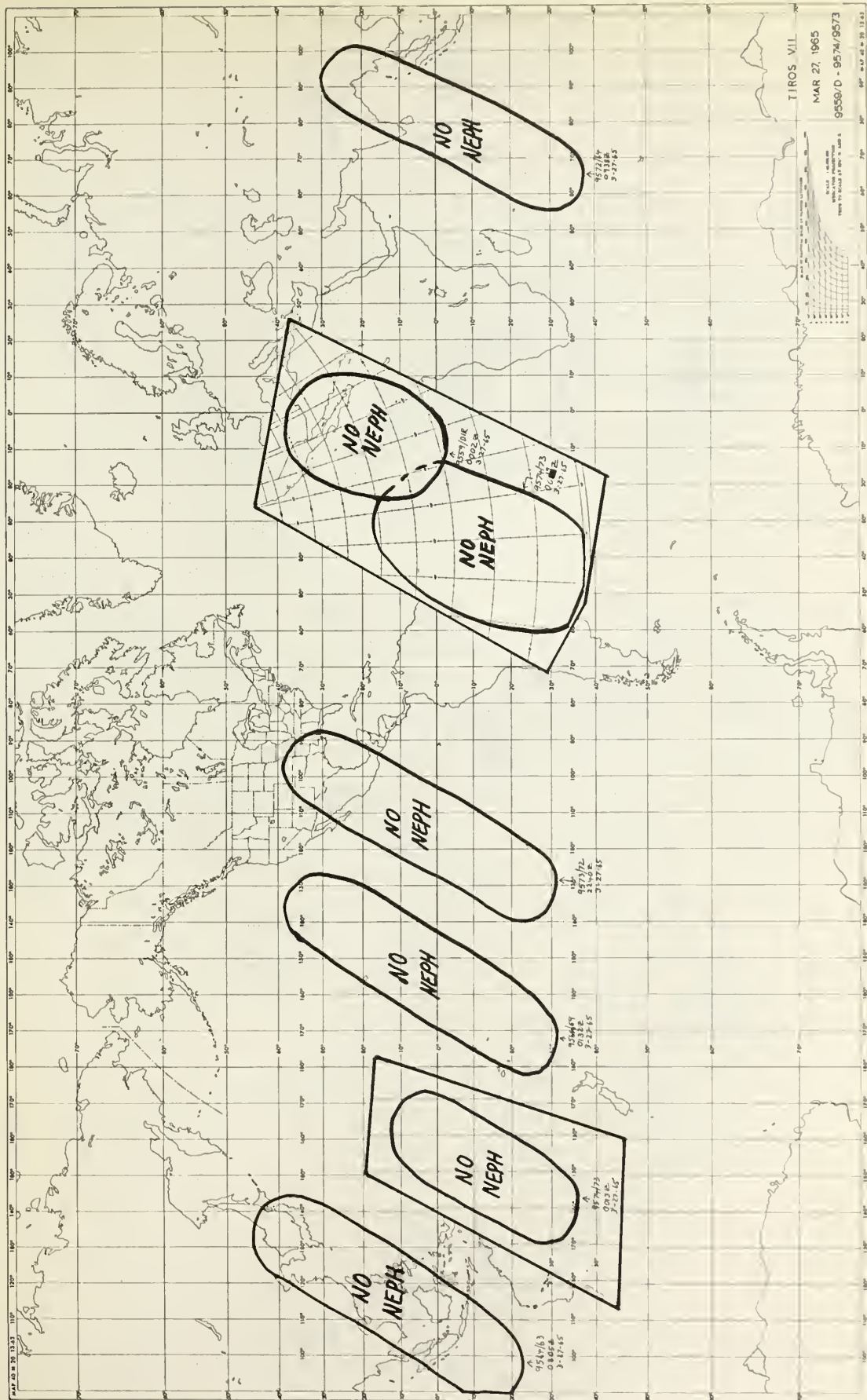




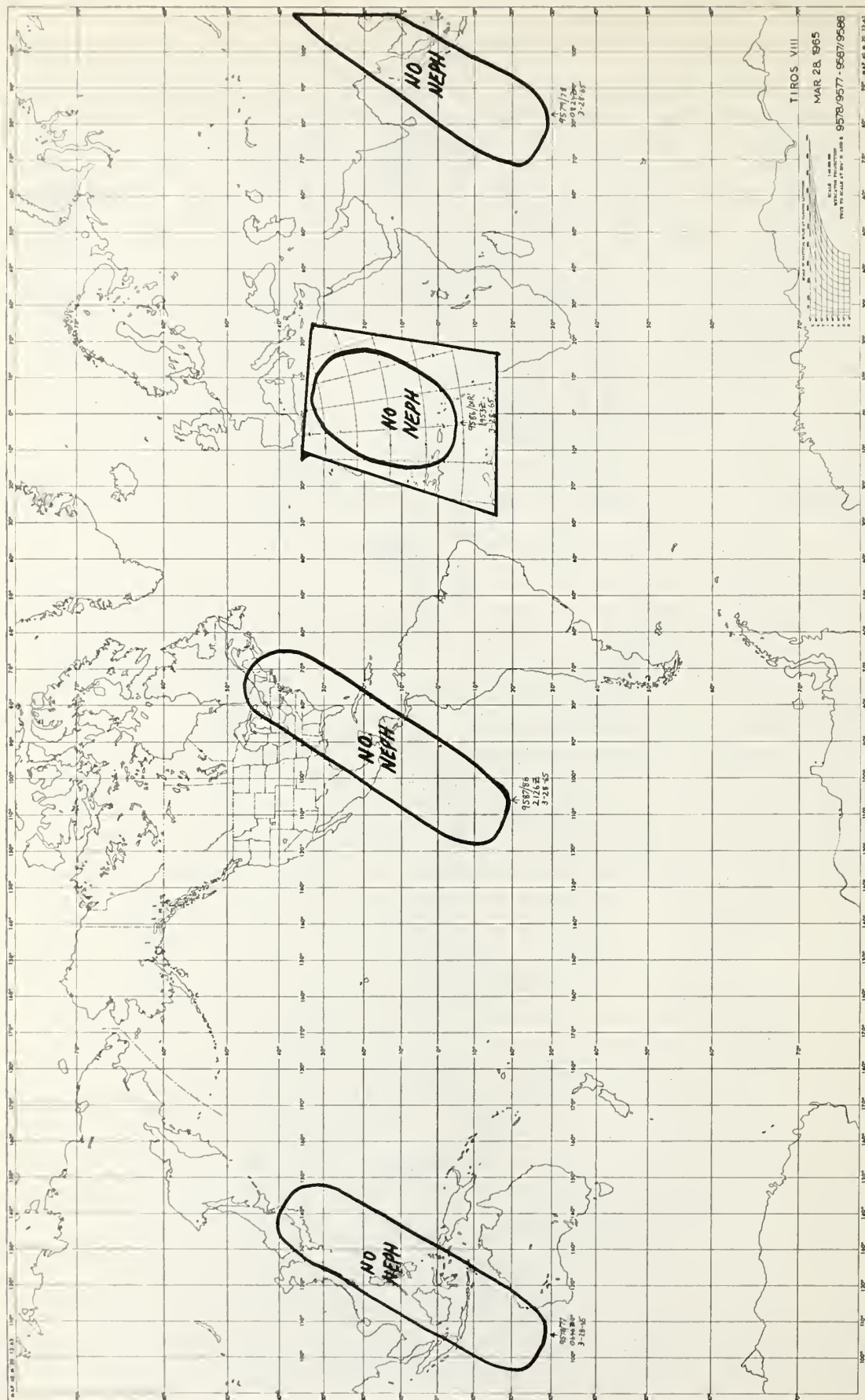








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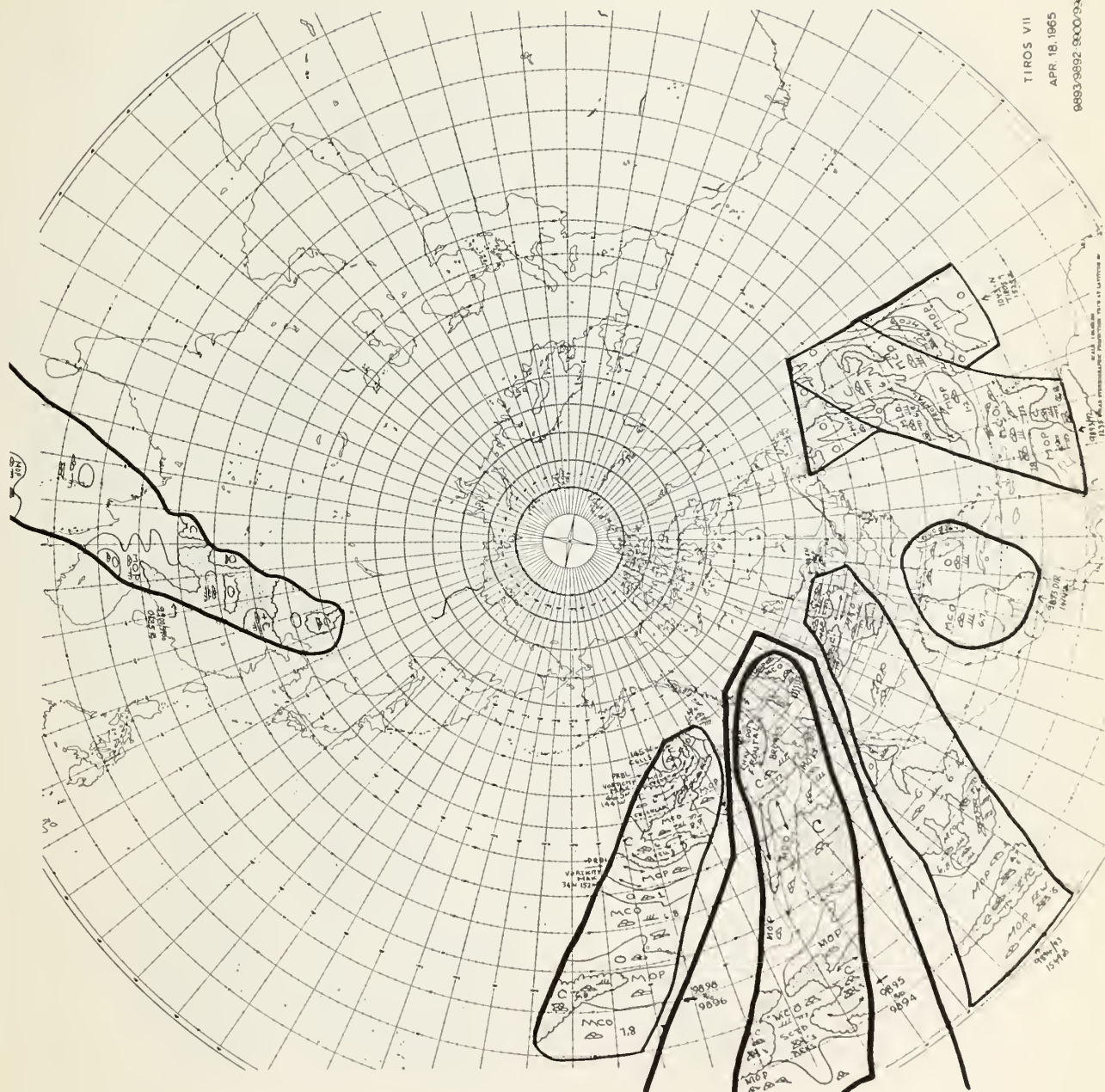




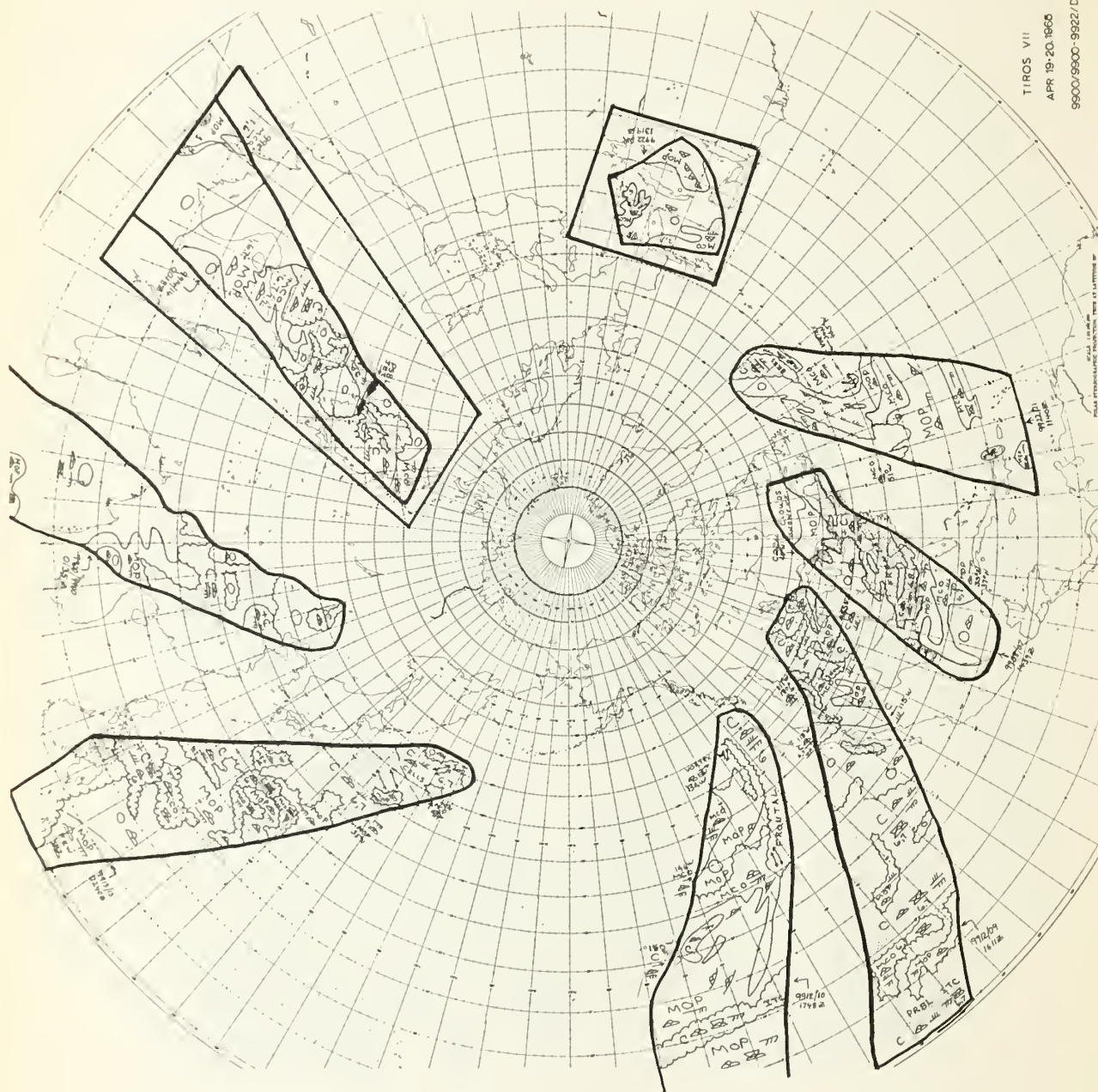




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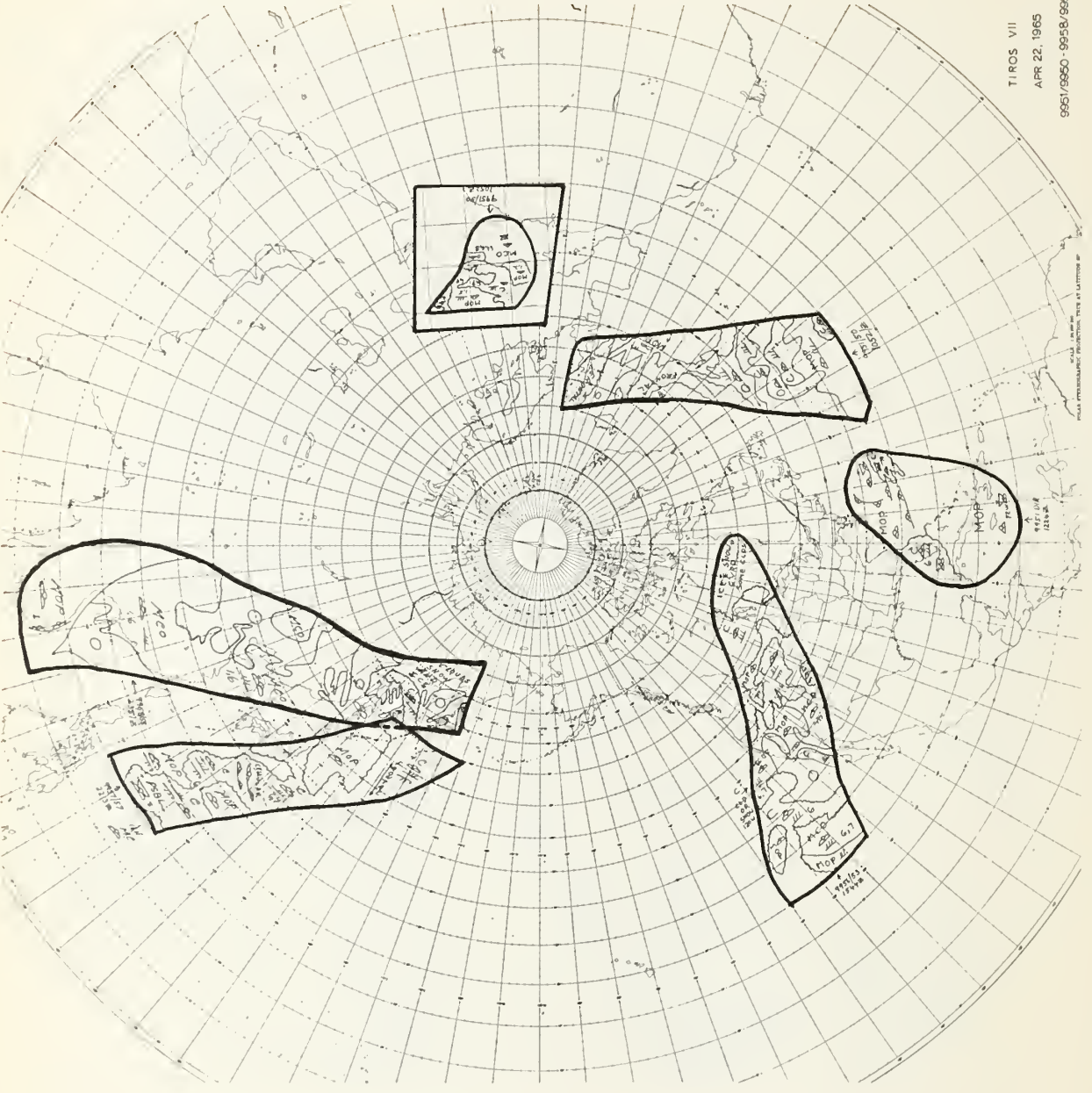


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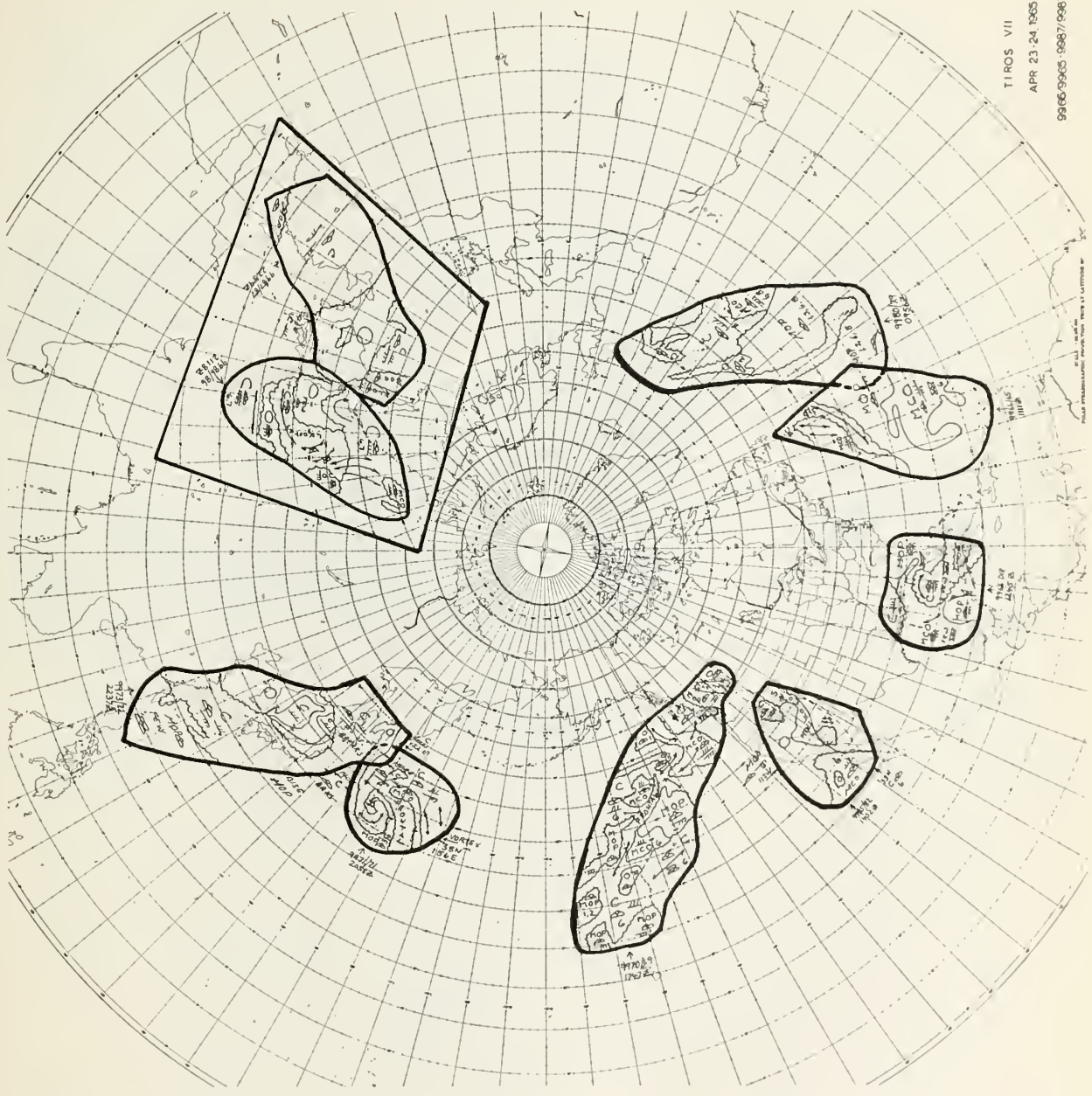






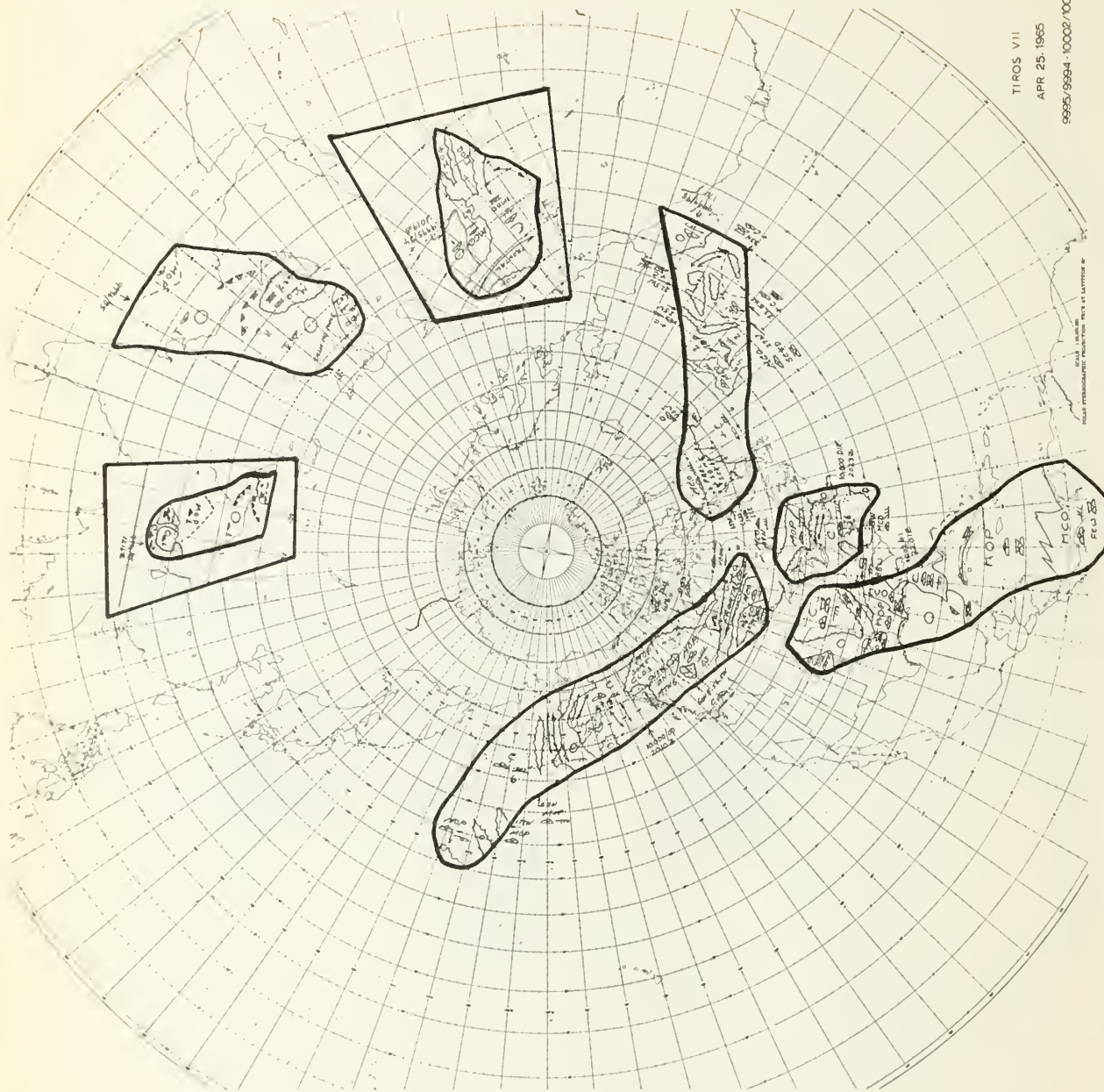
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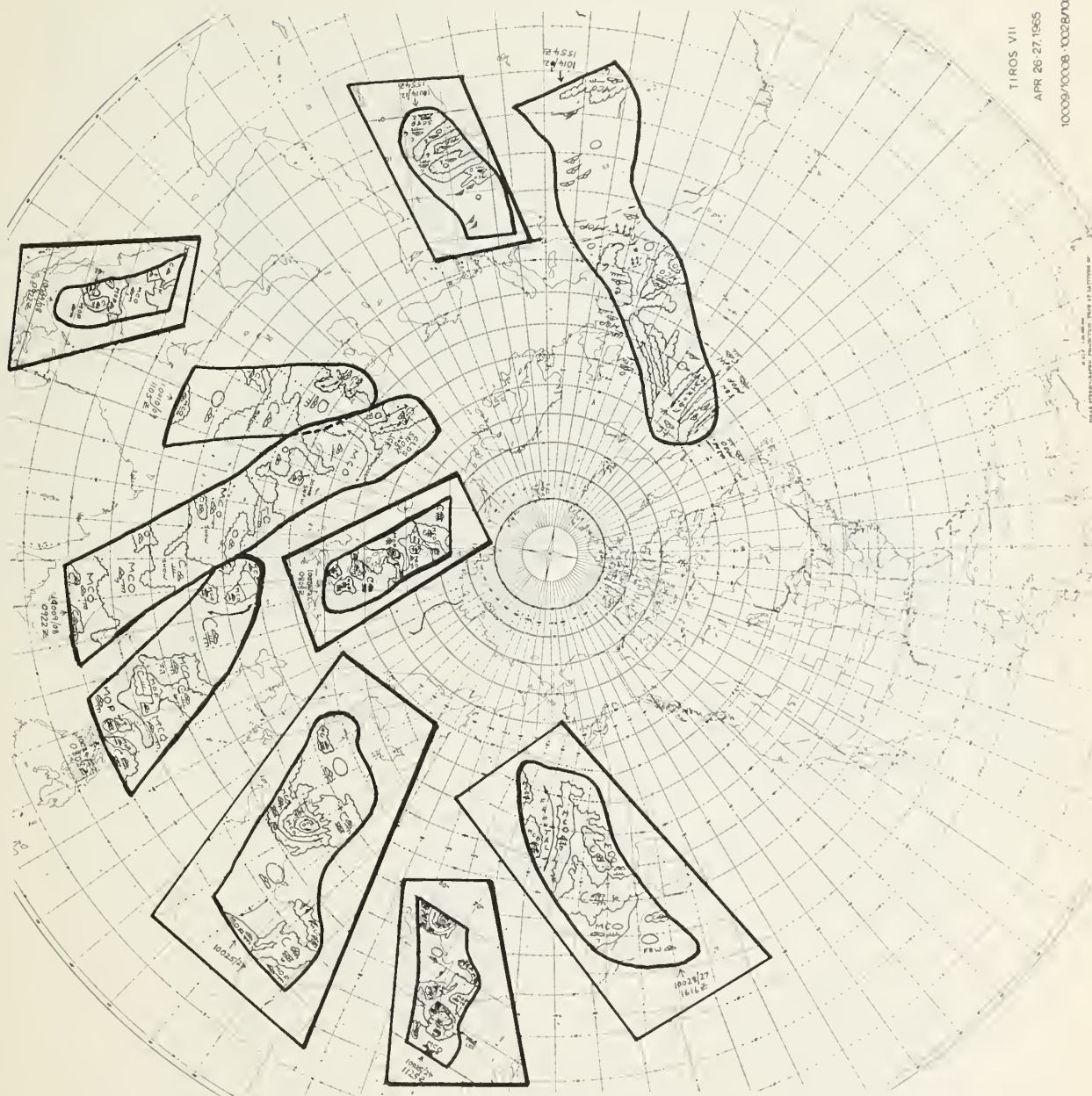




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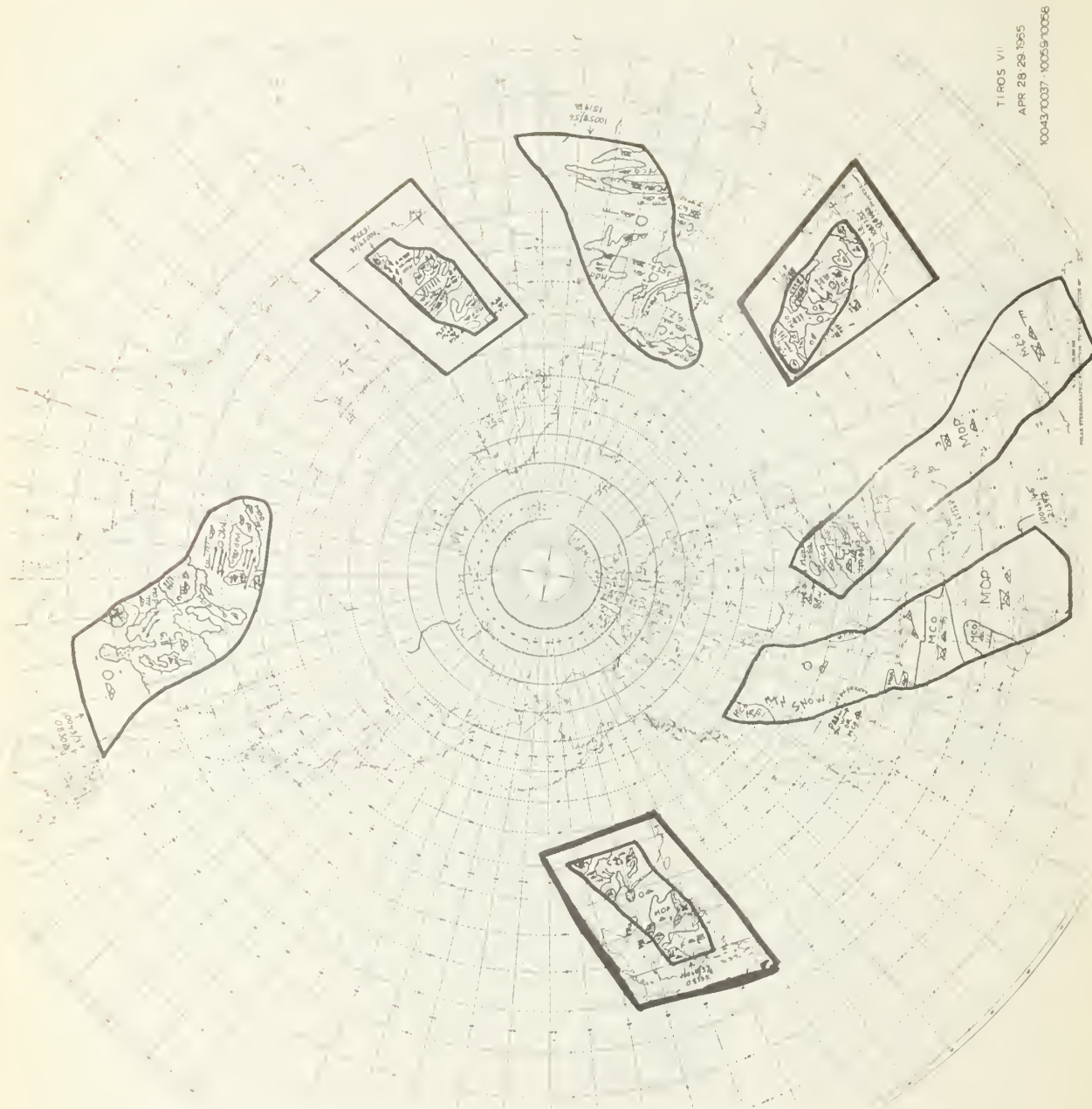


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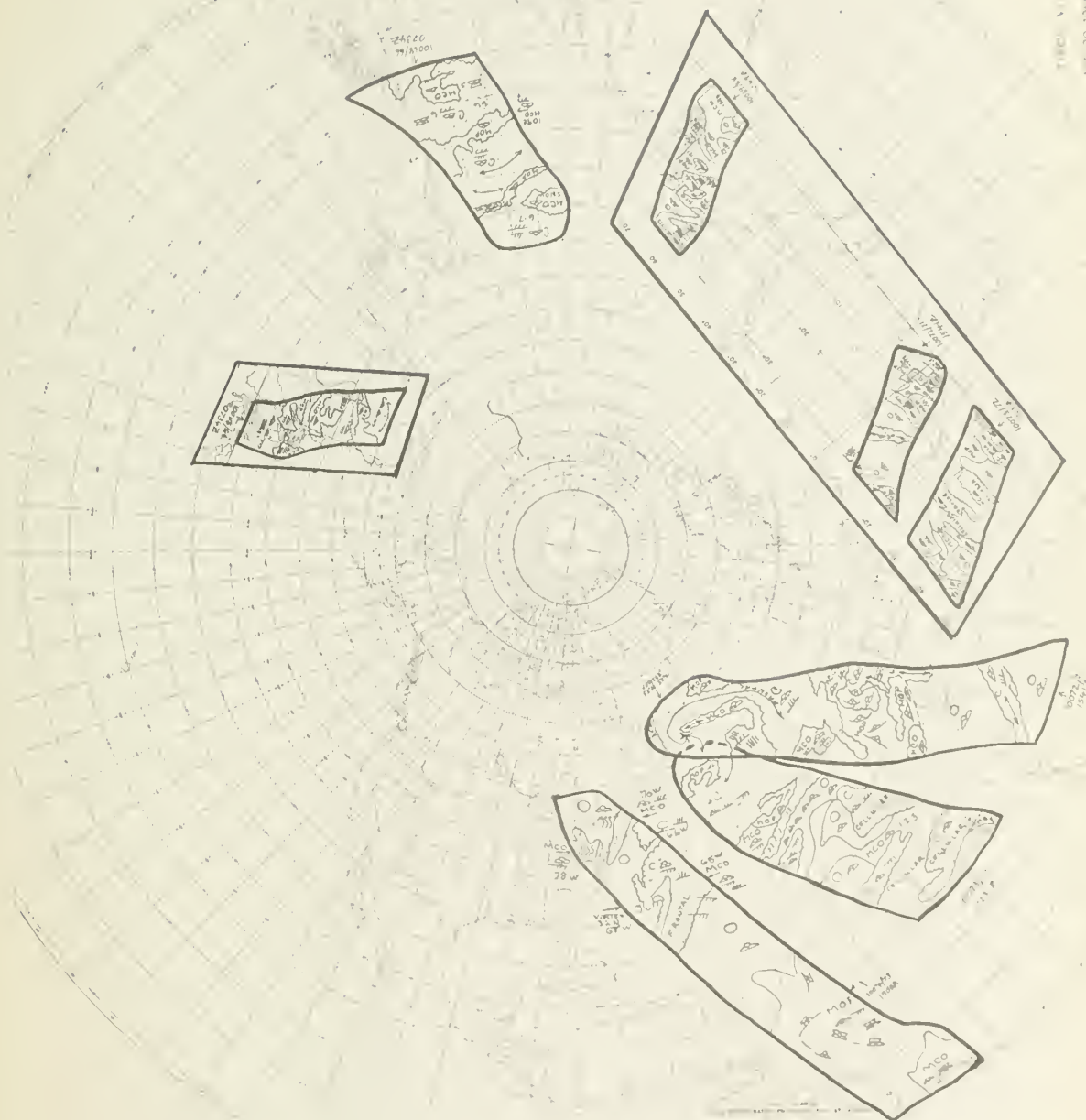
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